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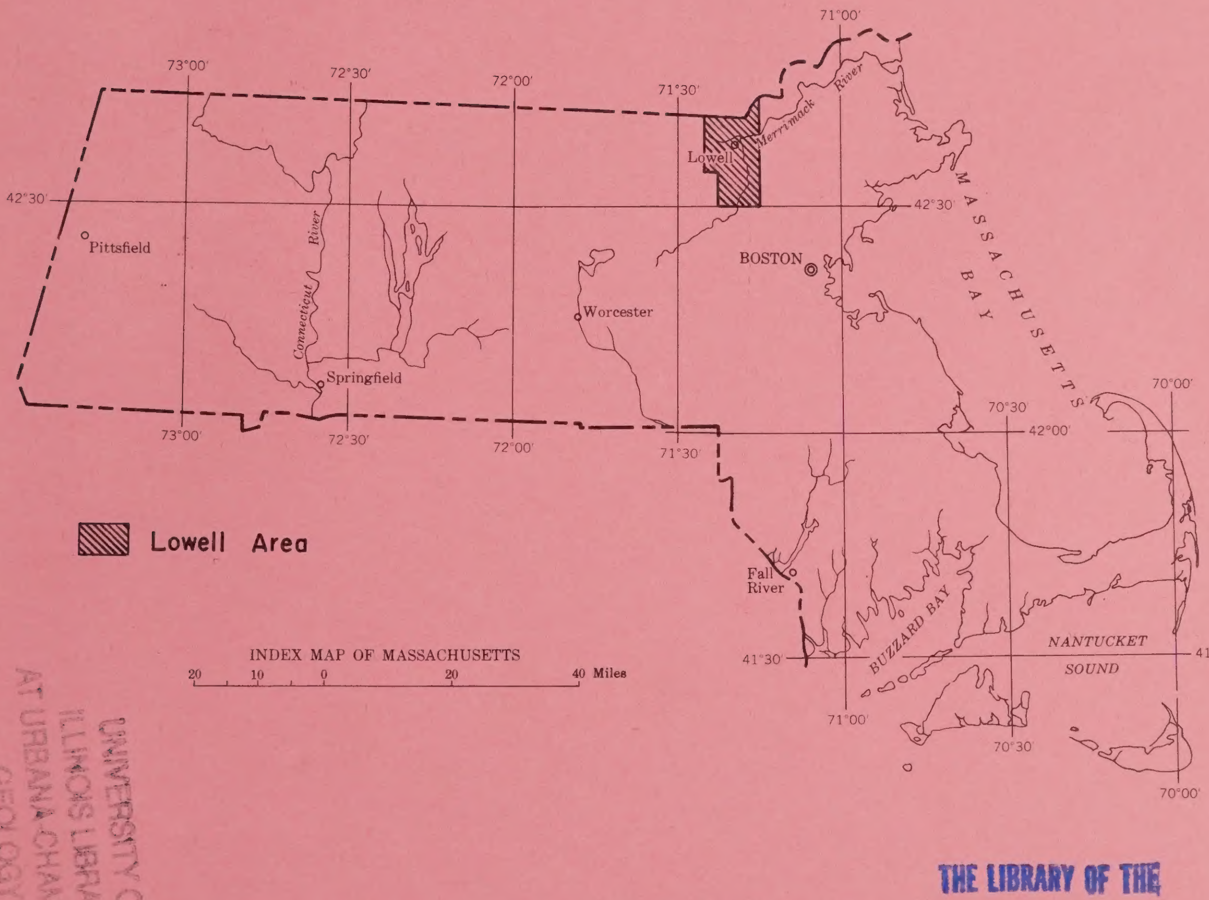
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

MASSACHUSETTS BASIC-DATA REPORT NO. 3
GROUND-WATER SERIES

LOWELL AREA

By

JOHN A. BAKER and RICHARD G. PETERSEN



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MASSACHUSETTS BASIC DATA REPORT NO. 3
GROUND-WATER SERIES

LOWELL AREA

Records and logs of selected wells and test holes, records of selected springs, and chemical analyses of water in the Lowell area, Massachusetts

By

John A. Baker and Richard G. Petersen

Prepared in cooperation with

THE COMMONWEALTH OF MASSACHUSETTS, DEPARTMENT OF PUBLIC WORKS

Boston, Massachusetts

1962

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INTRODUCTION

The Lowell area includes most of the Lowell metropolitan area, which consists of the city of Lowell and the surrounding towns of Billerica, Chelmsford, Dracut, and Tewksbury. In addition it includes most of the town of Carlisle and parts of the towns of Bedford, Concord, and Tyngsborough. The Lowell area covers about 115 square miles in the upper part of the Merrimack River valley in northeastern Massachusetts.

This report presents basic data collected as part of an investigation of ground-water resources in the Lowell area, Massachusetts by the U. S. Geological Survey in cooperation with the Massachusetts Department of Public Works. The data have been prepared for release in order to make available to the public basic ground-water data that will be useful guides in studying and planning water-resource development.

Most of the data contained in this report were collected over a period of years by M. L. Brashears, Jr., C. M. Roberts, H. N. Halberg, E. W. Reed, H. S. Taylor, and M. A. Pistrang. The data include records of about 550 wells or groups of wells and test holes and logs of 160 wells and test holes. The locations of wells, springs, and test holes are shown on figure 1 accompanying this report.

Table 1 is intended to be an aid for determining the general characteristics and relative excellence as aquifers of the water-bearing units penetrated by the wells and test holes.

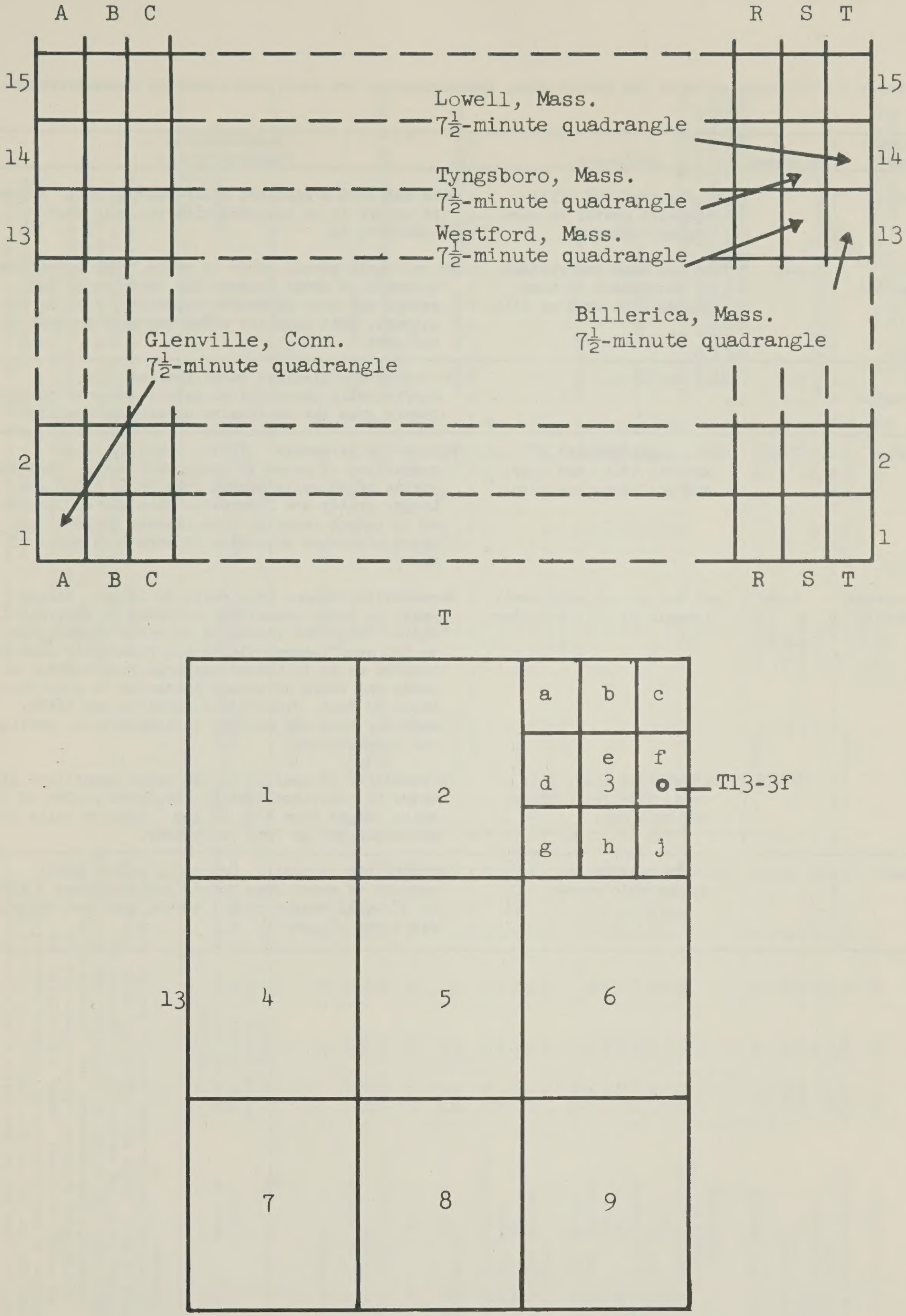
In table 3 the well and test hole numbers and location coordinates correspond to those in the table of well records (table 2). The drillers' logs have been rearranged and modified slightly for uniformity.

WELL NUMBERING AND LOCATION SYSTEMS

In Massachusetts each well is designated by the name of the town or city in which it is located and a number that is assigned in the order in which the well was inventoried within the town or city. A separate series of numbers beginning with 1 is used within each town or city. In tables 2, 3, 4, and 5 the name of the town or city and the number are given, but on the map only the number appears beside the symbol of the well it represents. Thus, the well designated Billerica 8 in table 2 is represented on the map (fig. 1) by the well symbol numbered 8 in the town of Billerica. Springs are numbered similarly, but the letters "sp" follow the numbers in order to distinguish them from well numbers.

For ease in locating wells, test holes, and springs on the map, a well-location system, based on the 7½-minute quadrangles in New England, has been adopted. In this system each 7½-minute quadrangle is designated by a capital letter and a number, beginning with A 1 for the Glenville quadrangle, Connecticut. From here, the quadrangles are lettered from west to east and numbered from south to north. Each 7½-minute quadrangle is divided into nine 2½-minute rectangles, and each 2½-minute rectangle is subdivided into nine 50-second rectangles, as shown in figure 2.

On the well-location map (fig. 1), the quadrangle designators are indicated on the margins, and the 2½-minute rectangles are bounded by the lines of latitude and longitude, but the 50-second rectangles are not shown.



Billerica 7½-minute quadrangle

Figure 2.--Sketch illustrating well-location system

Table 1.--Geologic units in the Lowell area, Massachusetts, and their water-bearing characteristics

Geologic unit	Thickness	Character	Water-bearing characteristics
Alluvium	-	Chiefly sand and silt; contains gravel in some stream channels.	Does not form a distinct water-bearing unit. Where it occurs it is included with the unit that underlies it.
Swamp deposits	0-7	Peat and muck interbedded or intermixed in some places with sand or silt.	Do not yield ground water to wells. May retard the movement of water between the surfaces of the swamps and more permeable materials, such as the outwash, that underlie swamp deposits in most of the area.
Wind deposits	0-4	Sand and silt.	Do not form a distinct water-bearing unit. Sufficiently permeable to permit water to percolate freely from the surface to underlying deposits.
Outwash	0-98	Sand, small amounts of gravel, silt, and clay, and scattered boulders.	Moderately permeable. Yields small to large quantities of water to individual wells. Reported yields of 28 wells ranged from 15 to 1,000 gpm. Larger yields are from wells that are so located as to induce recharge from streams or ponds and where saturated thickness is more than about 50 feet.
Ice-contact deposits	0-140	Sand and gravel with small amounts of silt and clay.	Permeability ranges from small to large. Yields small to large quantities of water to individual wells. Reported yields of 50 wells ranged from 6 to 630 gpm. Larger yields are from wells that are located so as to induce recharge from streams or ponds and where saturated thickness is more than about 30 feet. Individual deposits may differ markedly from one another in composition, sorting, and permeability.
Till	0-175	Unstratified clay, silt, sand, pebbles, cobbles, and boulders.	Permeability is small. Yields small quantities of water to individual wells. Reported yields of 5 wells ranged from 4 to 15 gpm. Shallow wells on hillsides may go "dry" in summer.
Bedrock	-	Chiefly igneous and metamorphic rocks.	Permeability is small. Generally yields small amounts of water from joints and fractures. Yields of 37 wells ranged from 1 to 130 gpm, but median yield was 12 gpm.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts

Well no.: See text for description of well-numbering system.
Location: See text for description of well-location system.
Altitude of land-surface datum: Altitudes expressed in feet and tenths, or in feet, tenths, and hundredths are instrumentally determined; those in whole feet are interpolated from topographic maps. Datum is mean sea level.
Type of well: Dn, driven; Dr, drilled; Du, dug; Du-Dn, dug and driven; Du-Dr, dug and drilled; GP, gravel-packed.
Depth of well: Depths below land-surface datum. Depths given in feet are reported; depths given in feet and tenths are measured.

Level: Water levels expressed in feet are reported; water levels expressed in feet and tenths or feet, tenths, and hundredths are measured. Depths are below land-surface datum, unless preceded by a + indicating they are above land-surface datum.
Use: D, domestic; I, industrial or commercial; Ir, irrigation; O, U. S. Geol. Survey observation well; PS, public supply; S, stock.
Remarks: C, chemical analysis in table 4; L, log in table 3; T, temperature in degrees Fahrenheit; Y, yield in gallons per minute; dd, drawdown in feet produced by pumping at preceding rate.

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Water: Use	Remarks
BILLERICA														
8	T13-2h	Rearden	-	115	Du	28	48	-	-	Ice-contact deposits	22	5- -39	D	
14	T13-6f	G. E. Spaulding	1927	140	Du	9.6	36	-	Sand	do.	4.61	6- 2-39	D	Water "high in iron".
17	T13-6e	McGuire	1910	150	Du	12.5	48	10	Sand?	do.	5.00	6- 3-39	D	
18	T13-3j	Joseph Mellertreo	1917	120	Dn	35	2½	-	Fine sand	do.	16-18	-17	D	Owner reported "hardpan" at depth of 16-18 feet.
19	T13-3j	do.	1917	120	Dn	30	2½	-	do.	do.	16-18	-17	Ir	Do.
20	T13-3j	do.	1917	120	Du	8.0	60	-	do.	do.	4.05	6- 3-39	Ir	
21	T13-3j	Baroni	1928	145	Du	24.4	30	-	Sand and gravel	do.	18.0	6- 3-39	D	Owner reported "hardpan" at depth of 18 feet.
22	T13-3h	Sylvester O'Toole	1900	170	Du	23	36	-	-	Till	6.7	1-12-55	S	C.
24	T13-3h	Ben Kearney	1850	140	Du	28	60	22	-	do.	23	8- -34	-	
25	T13-3h	do.	1850	140	Du	18	120	-	Gravel	do.	-	-	-	
26	T13-3h	Fred Martin	1900	170	Du	35	96	15	-	do.	-	-	-	
32	T13-5c	Hans	1934	130	Du	18.7	24	-	Sand and gravel	Ice-contact deposits	12.51	6- 7-39	D,S	
33	T13-5b	Mrs. Nowack	1938	170	Du-Dn	11.4	2	-	-	Till	9.90	6- 7-39	S	Well goes dry in summer.
34	T13-5b	Mrs. Sullivan	1910	200	Du	6.1	60	-	-	do.	.52	6- 7-39	S	
35	T13-5b	do.	1910	200	Du	11.5	36	-	-	do.	9.20	6- 7-39	D	
36	T13-5b	do.	1910	200	Du	15.2	36	-	-	do.	7.70	6- 7-39	S	
39	T13-5d	W. W. Cowdrey	1890	220	Du	12.4	36	-	-	do.	5.91	6- 7-39	D,S	Water "contains iron".
42	T13-5h	Larson	1900	210	Du	10.40	72	-	-	Till	6.10	6- 7-39	D,S	Y 13.
43	T13-5h	do.	1840	210	Du	12.2	54	-	-	do.	5.23	6- 7-39	S	
45	T13-5f	Middlesex County House of Correction	1931	165	Dn	19.0	2½	30	Sand	Outwash and alluvium	5.75	6- 9-39	PS	Y 250; dd 8.0 in observation well 250 feet south of group of 8 wells, and dd 4.0 in observation well 150 feet northwest of group. The water level was measured in the most northerly well of the group.
48	T13-5c	Mrs. Rawling	-	130	Du	17	48	-	Gravel	Ice-contact deposits	12	6- 9-3	D	
55	T13-8c	Hansen	1930	160	Du	30	36	-	-	Till	-	-	D	
56	T13-8c	do.	1932	160	Dr	60	6	-	-	Bedrock	-	-	D	
57	T13-8f	E. Pickman	-	120	Du	12.0	60	-	-	Till	5.62	6-12-39	D	Well said to go dry occasionally.
58	T13-9a	Yaras	1922	220	Du	25	36	-	-	do.	-	-	D	
60	T13-9d	Joseph Bouchere	1928	150	Du	16.4	42	-	Gravel	Ice-contact deposits	8.60	6-13-39	D	
61	T13-6j	N. R. Jones	1900	230	Dr	60	6	-	-	Till?	30	6-13-39	D,Ir,S	Y 4. If well is pumped at 7 gpm for 1½ hours, water level is drawn below the intake.
62	T13-6j	do.	1890	230	Du	27.8	36	-	-	Till	16.20	6-13-39	-	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Water: Use	Remarks
						BILLERICA--Continued								
63	T13-6j	N. R. Jones	1900	230	Dr	-	6	-	-	Till?	-	-	-	
65	T13-6d	John Granfield	1918	120	Dn	21	2½	-	Sand	Ice-contact deposits	16	-	D,Ir	
66	T13-6d	John McCullen	1932	120	Du	30	48	-	do.	do.	4	-	D	
67	T13-6d	William Goday	1938	130	Du	18	18	-	do.	do.	12	10- -38	D	
73	T13-6a	Town of Billerica	1932	110	GP	40	18	-	Sand and gravel	Outwash and alluvium	5	6-10-39	PS	Y 400; dd 8.
74	T13-6a	do.	-	110	GP	40	18	-	do.	do.	5	6-10-39	PS	Y 400; dd 8.
76	T13-9c	Mrs. E. Martin	1920	180	Du	9.9	70	-	-	Till	3.05	6-19-39	-	Well goes dry in late summer.
77	T13-9c	do.	1930	180	Dr	150	6	-	-	Bedrock	10	-	D,S	Water "contains iron".
78	T13-9c	do.	1920	180	Du	16	42	-	-	Till	-	-	D	Well sometimes goes dry in September.
79	T13-9c	do.	-	180	Du	30?	48	-	-	do.	-	-	-	
80	T13-9c	do.	1920	210	Dr	400?	8	-	-	Bedrock	-	-	D,S	Water "contains iron".
83	T13-3h	G. H. Hill	1884	120	Du	8	120	-	Sand	Ice-contact deposits	4½	9- -14	D	
84	T13-6j	J. P. Sewell	-	180	Du	9	120	-	-	Till	-	-	D	
85	T13-6j	do.	-	180	Du	9	12	-	-	do.	-	-	D	
86	T13-6h	Mitchell School	-	210	Du	10	72	-	-	do.	5	10-17-28	-	
87	T13-9b	J. H. Condon	-	260	Dr	57	6	-	-	Bedrock	-	-	D	
88	T13-2j	Manning Manse Assoc.	-	130	Du	2	-	-	Gravel	Ice-contact deposits	-	-	-	
89	T13-2j	do.	-	130	Du	30	36	-	Sand and gravel	do.	28	8-22-29	D	
90	T13-9c	I. A. Johnson	1875	210	Du	27	36	-	-	Till	-	-	D,S	
91	T13-5f	V. M. Rollins	1915	150	Du	20	36	-	Sand and gravel	Ice-contact deposits	-	-	D,S	
92	T13-6a	Town of Billerica	1949	116	GP	36	24	-	do.	Outwash and alluvium	4.74	5- -49	PS	Y 412; dd 13.96. C. L. T 42.
93	T13-6a	do.	1948	110	Dn	44	2½	-	Sand	do.	4	8- -48	-	Y 50; dd 1.16. L.
94	T13-6a	do.	1948	110	Dn	40	2½	-	Sand and gravel	do.	4	8- -48	-	L.
95	T13-6a	do.	1948	110	Dn	29	2½	-	do.	do.	5	8- -48	-	L.
96	T13-6a	do.	1948	110	Dn	42	2½	-	do.	do.	5.5	9- -48	-	Y 100; dd 3.1. L.
97	T13-6a	do.	1947	110	Dn	42	2½	42	do.	do.	6.83	12- -47	-	Y 40; dd 3.82. L.
110	T13-6b	Boston & Maine RR	1925	115	Dn	25.0	-	25.0	do.	Ice-contact deposits	4.0	-	-	L.
111	T13-6b	do.	1925	115	Dn	26.3	-	26.3	do.	do.	.71	6- 5-39	-	L.
112	T13-6b	do.	1925	115	Dn	26.2	-	26.2	do.	do.	3.8	-	-	L.
113	T13-6b	do.	1925	115	Dn	25.0	-	25.0	do.	do.	3.8	-	-	L.
114	T13-6b	do.	1926	115	Dn	24.5	-	24.5	do.	do.	2.5	-	-	L.
115	T13-6b	do.	1926	115	Dn	30.0	-	-	do.	do.	1.5	-	-	L.
116	T13-6b	do.	1926	115	Dn	30.0	-	30.0	do.	do.	2.6	-	-	L.
117	T13-6b	do.	1926	115	Dn	33.5	-	33.5	do.	do.	-	-	-	L.
118	T13-6b	do.	1926	115	Dn	32.0	-	-	do.	do.	3.0	-	-	L.
119	T13-6b	do.	1926	115	Dn	34.0	-	-	do.	do.	3.0	-	-	L.
120	T13-6b	do.	1926	115	Dn	28.7	-	28.7	do.	do.	2.7	-	-	L.
121	T13-6b	do.	1926	115	Dn	24.5	-	24.5	do.	do.	-	-	-	L.
122-209	T13-6a	Town of Billerica	1917-1932	115	Dn	36-40	2½	-	Gravel	Outwash and alluvium	5	-	-	
210-241	T13-6a	do.	1898	115	Dn	36-40	4	-	do.	do.	4-5	-	-	
242-250	T13-6a	Commonwealth of Mass. Bridge B-12-3	1919	93.4	Dn	11.2-26.7	2½	20.8	-	-	-	-	-	L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
BILLERICA--Continued														
251	T13-6b	Boston & Maine RR	1918	113	Dn	25.5	-	-	Sand and gravel	Ice-contact deposits	0.5	12- -18	-	L.
252	T13-6b	do.	1918	113	Dn	22.0	-	-	do.	do.	2.0	12- -18	-	L.
253	T13-6b	do.	1918	114	Dn	25.0	-	25.0	do.	do.	2.0	12- -18	-	L.
254	T13-6b	do.	1918	114	Dn	22.9	-	-	do.	do.	2.0	12- -18	-	L.
255	T13-6b	do.	1918	114	Dn	22.1	-	-	do.	do.	2.0	12- -18	-	L.
256	T13-6b	do.	1918	117	Dn	33.7	-	33.7	do.	do.	2.0	12- -18	-	L.
257	T13-8c	Lucio Turco	-	140	Du	28	24	-	do.	do.	18.32	3- 5-54	D,I	C. T 54.
258-271	T13-6g	Commonwealth of Mass. Bridge B-12-21	1951	193.2-198.0	Dn	5.5-14.4	2½	5.5-14.0	-	Till	-	-	-	L.
272-285	T13-6g	Commonwealth of Mass. Bridge B-12-22	1951	100.4-115.7	Dn	0.7-6.1	2½	0.7-6.1	-	do.	-	-	-	L.
286-300	T13-5f	Commonwealth of Mass. Bridge B-12-23	-	152.2-185.5	Dn	2.5-13.4	2½	2.5-13.4	-	do.	-	-	-	L.
301-313	T13-5f	Commonwealth of Mass. Bridge B-12-24	1951	157.0-171.8	Dn	1.4-9.2	2½	1.4-9.2	-	do.	-	-	-	L.
314-325	T13-5b	Commonwealth of Mass. Bridge B-12-25	1951	158.5-167.5	Dn	1.3-7.7	2½	1.3-7.7	-	do.	-	-	-	L.
326-340	T13-9b	Commonwealth of Mass. Bridge B-12-26	1952	214.0-235.1	Dn	3.0-20.7	2½	3.0-20.7	-	do.	4.4	-	-	L.
341	T13-5j	Louis Zanoli	-	190	Dr	143	6	83	-	Bedrock	2	-	D	Y 5. T 51.
342	T13-5j	Mrs. Donahue	-	180	Du	15.0	36	-	-	Till	7.5	4- 8-54	D	
343	T13-5j	-	-	170	Dn	40	1¼	-	-	Ice-contact deposits	-	-	D	
344	T13-8c	Granville Smith	1942	130	Dn	32	1¼	-	Sand	do.	26	-	D	
345	T13-8b	W. L. Furbish	1950	140	Dr	115	6	0	-	Bedrock	-	-	D	Y 36. Water "contains iron".
346	T13-8b	C. H. Hannafin	1950	140	Dr	46	6	4	-	do.	-	-	D	Y 6.
347	T13-8c	L. Biron	-	120	Du	6.5	24	-	Sand and gravel	Ice-contact deposits	2.69	4-15-54	D	Well dry in 9-53. Water "contains iron".
349	T13-8c	-	1952	150	Dr	105	6	17	-	Bedrock	18	-52	D	Y 1. Water "contains iron".
350	T13-8f	Maryknoll Novitiate	1936	150	Dr	180	8	-	-	do.	-	-	PS	About 90 people supplied.
351	T13-8f	do.	-	140	Du	9.6	72	-	-	Ice-contact deposits	4.23	4-29-54	Ir	
352	T13-3g	R. J. Farnan	1952	160	Dr	164	6	4	-	Bedrock	-	-	D	Y 2. Well reportedly flowed when drilled.
353	T13-6a	P. J. Hayes	1900	140	Du	20.9	-	-	Hardpan	Till	5.77	9-24-54	D	T 56.
354	T13-6c	Carl Cross	1954	160	Du-Dn	11	1¼	-	Sand, some gravel	Ice-contact deposits	7	9-29-54	D	
CARLISLE														
1	T13-7c	H. A. Lee	1925	190	Dr	57.1	6	12	-	Bedrock	11.59	6- 8-39	D	
2	T13-7c	E. E. Beacham	1926	175	Du	12.6	36	-	"Blue clay", sand, and gravel	Ice-contact deposits	5.82	6- 8-39	D	Goes dry in dry seasons.
3	T13-7c	Nunzietto	1930	170	Dr	60.5	6	10	-	Bedrock	6.10	6- 8-39	D	
4	T13-7c	Miss C. E. Hill	1937	170	Dr	50	6	-	-	do.	7	9- -37	D	
5	T13-7c	C. L. Little	1915	170	Du	11.7	120	-	-	Till	4.83	6- 9-39	D	
6	T13-7c	Mrs. C. Reynolds	1932	210	Du	13.9	48	-	-	do.	6.59	6- 9-39	D	Goes dry in dry seasons.
7	T13-5g	-	-	205	Du	15.5	24	-	-	do.	8.92	6- 9-39	D	
8	T13-4f	T. E. Lynch	1900	200	Du	13.4	36	36	-	do.	8.33	6- 9-39	D	Goes dry every July.
9	T13-4f	Smith	-	175	Du	7.0	36	-	-	do.	4.09	6- 9-39	-	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
CARLISLE--Continued														
10	T13-4f	I. J. Lhussia	1764	180	Du	32	36	-	Sand and gravel	Ice-contact deposits	26	6- -38	D,S	
11	T13-4e	Alex. Alukonis	-	220	Du	40.2	36	-	-	Till	12.90	6- 9-39	D,S	Goes dry in very dry seasons.
12	T13-4e	L. Gendreau	-	210	Du	25.7	36	-	-	do.	10.62	6-12-39	I	
13	T13-4e	W. C. Hadley	1904	210	Du	18	36	-	Hardpan	do.	11	6- -39	D	Water "hard".
30	T13-5d	Torrielli	-	185	Du	9.5	42	-	-	Ice-contact deposits	5.83	6-13-39	D	
31	T13-5g	Fred Nicols	-	220	Du	13.6	36	-	-	Till	5.95	6-13-39	D	
32	T13-5g	Robert McAllister	1929	300	Dr	130	6	-	-	Bedrock	60	7- -29	D,S	Y 3.
33	T13-7b	E. H. Wilkins	1811	210	Du	17.3	60	18	-	Till	12.25	6-16-39	D	
34	T13-4h	T. O. Garthe	1932	255	Du	17.5	36	-	-	do.	6.14	6-15-39	D	
35	T13-4h	L. D. Lahm	1907	270	Dr	40	6	-	-	Bedrock	5	7- -07	D,S	Y 60. About 6,000 gpd pumped.
36	T13-7b	George Otterson	1935	200	Dr	86.5	6	-	-	do.	13.72	6-15-39	D	
37	T13-7b	H. B. Stearns	1929	210	Dr	48.2	6	10	-	do.	18.42	6-15-39	D,S	
38	T13-8a	C. O. Philbrick	-	180	Du	21.3	36	17	-	Ice-contact deposits	13.84	6-15-39	-	
39	T13-8a	Fred Philbrick	-	140	Du	9.7	48	-	-	do.	6.11	6-15-39	-	
48	T13-7f	R. B. Bates	-	170	Du	7.5	60	-	-	do.	4.87	6-16-39	D,S	
53	T13-7e	W. D. Wilson	1933	195	Dr	100	6	5	-	Bedrock	12	7- -33	D	Y 9; dd 28. Water "hard".
64	T13-7f	E. F. Bearce	1890	225	Du	12.6	24	13	-	Till	9.57	6-21-39	-	
65	T13-7j	H. F. Smith	1890	190	Du	14.0	36	-	-	do.	9.52	6-21-39	D	
66	T13-7f	Pauline Leelman	1920	190	Du-Dn	26	36-2½	26	-	do.	6.63	6-21-39	D,S	Well goes dry in very dry weather.
67	T13-8d	Mrs. Davis	1910	165	Du	22.7	30	-	Sand and gravel	Ice-contact deposits	19.71	6-21-39	D,S	Well goes dry in dry seasons.
68	T13-8a	W. G. Ambrose	1933	170	Du	16.7	30	-	Coarse sand	do.	13.18	6-21-39	D	
70	T13-8d	Mrs. M. E. Spooner	1930	170	Dr	100	6	30	-	Bedrock	-	-	D,S	
71	T13-8d	do.	1930	170	Du	20	48	-	-	Ice-contact deposits	-	-	D,S	
72	T13-8g	M. Garfield	1915	160	Du	18.4	36	-	-	do.	10.92	6-21-39	-	
73	T13-8g	do.	1915	160	Du	15.9	42	-	-	do.	11.38	6-21-39	-	
74	T13-8g	do.	1915	160	Du	12.7	30	-	-	do.	8.36	6-21-39	-	
75	T13-8g	Frank Booth	1925	165	Du	19	36	-	-	do.	15	6- -39	D,S	
79	T13-8h	Carl Spooner	1926	120	Du	18	-	-	-	do.	15	10- -26	D	
80	T13-7b	Town of Carlisle	1914	220	Dr-Dn	60	-	8	-	Bedrock	-	-	PS	
81	T13-7f	H. O. Bates	1926	165	Du	30	-	-	-	Ice-contact deposits	25	6- -26	D	
82	T13-8d	William Foss	1912	165	Du-Dr	87-97	-	27	-	Bedrock	-	-	D	
85	T13-8a	James Burell	1952	140	Dr	87	6	0	-	do.	18	-52	D	Y 3½.
86	T13-8g	-	-	130	Du	12.8	18	-	Sand and pebbles	Ice-contact deposits	6.62	4-13-54	-	
87	T13-8e	H. J. Halloran	-	130	Dr	80	6	-	-	Bedrock	-	-	S	Y 30. About 4,000 gpd used.
88	T13-8e	-	-	120	Dn	12	1¼	-	Sand and gravel	Ice-contact deposits	-	-	D	"Hardpan" at 12 feet.
CHELMSFORD														
1	T13-4a	M. Wright	1928	200	Du	10.1	60	-	-	Till	2.51	11-21-38	D	Iron precipitates after water stands.
2	T13-1g	Gott	1920	170	Du	9.9	36	10	-	do.	4.70	11-21-38	D,S	
3	T13-1d	Mary Ablachinkas	1925	270	Du	8.3	36	-	-	do.	.70	11-21-38	D,S	
4	T13-1g	Warren Right	1920	190	Du	23.0	36	-	-	do.	5.52	11-21-38	-	
5	S13-6c	J. Stange	1937	210	Du	9.9	30	-	-	do.	2.42	11-21-38	D,S	
6	S13-3j	Smith	-	220	Du	23.9	36	-	-	Ice-contact deposits	12.45	11-21-38	D	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
										CHELMSFORD--Continued				
13	S13-3j	L. E. Dalton and W. McHugh	-	185	Du	13.7	36	-	Sand	Ice-contact deposits	6.56	11-21-38	D,S	Water "hard".
16	T13-4d	Peter Wojtas	1931	230	Dr	60	6	18	-	Bedrock	-	-	D,S	
17	T13-4e	Bendes	1920	195	Du	30	40	-	-	Ice-contact deposits	27	11-22-38	D,S	
18	T13-4c	J. Lord	1933	155	Du	12.7	18	-	-	do.	6.97	11-22-38	D,S	
19	T13-1j	Mrs. E. Graham	1850	140	Du	12.3	54	-	-	Till	5.57	11-22-38	D,S	
21	T13-4c	Anthony Martin	-	155	Du	13.8	18	-	-	Ice-contact deposits	7.69	11-22-38	D	Water "hard".
22	T13-1j	R. C. Wood	1929	135	Dn	35	1½	-	-	do.	-	-	D	
23	T13-2g	Berge	1935	150	Du	27.1	36	-	-	do.	13.20	11-30-38	D	
24	T13-2g	do.	-	150	Du	9.5	60	-	-	do.	4.5	11-30-38	-	
25	T13-1j	American Moninger	-	130	Du	18.0	48	-	-	do.	12.0	11-30-38	-	
26	T13-1j	do.	-	130	Du	19.2	36	-	-	do.	15.6	11-30-38	D	
27	T13-2g	Stephen Kinnell	1932	135	Du	20.5	42	-	Sand and gravel	do.	15.7	11-30-38	D	
28	T13-2h	Mrs. A. Peltier	1937	180	Dr	71	6	5	-	Bedrock	-	-	D	
29	T13-2g	F. Meadeau	1912	130	Du	11.5	48	-	-	Ice-contact deposits	6.8	11-30-38	D	
30	T13-2g	do.	1938	130	Dn	19	2	-	Gravel	do.	6	11-30-38	S	
32	T13-2d	Mrs. McGillin	1900	130	Du- Dr	14.2- 28.3	48- 8	-	-	Bedrock	9.00- 17.68	11-30-38	D,S	
33	T13-2e	Mrs. M. Shinkwin	1900	115	Du	15.5	48	-	-	Ice-contact deposits	11.00	11-30-38	D	
37	S13-3c	John Norrie	-	280	Dr	132	6	72	-	Bedrock	-	-	D,Ir, S	Water "soft".
38	S13-3c	Edith M. Lambert	1932	280	Dr	118	6	33	-	do.	-	-	D,Ir	Y 28. Water "hard" and forms yellow coating.
39	T13-1b	E. S. Williams	1931	145	Du	19.4	60 x 36	19	Sand	Ice-contact deposits	13.53	11-30-38	I	Y 58.
40	T13-1b	J. G. Warren	1926	145	Du	19	30	12	-	do.	-	-	D	
41	T13-1a	Mrs. Zaher	-	190	Du	4	48	-	Sandy	Till	-	-	D	Water "soft".
42	S13-3c	William Zienva	1933	160	Du	24	36	-	Gravel	Ice-contact deposits	-	-	D	Water "contains iron".
43	T13-5a	Chimiliski	1916	130	Du	15.2	48	-	-	do.	9.65	12- 1-38	D	
44	T13-4c	Moran	1910	130	Du	15	36	-	-	Outwash and alluvium	8	-	D,S	Water "contains iron".
45	T13-2e	J. H. Jason	1921	110	Du	12.1	18	-	-	Ice-contact deposits	8.52	12- 1-38	D,S	Water level 9.20 feet below lsd 8-18-54.
46	T13-2e	do.	1890	115	Du	18.3	48 x 24	-	-	do.	13.12	12- 1-38	-	Water level 14.61 feet below lsd 8-18-54.
47	T13-2e	Ferreira	-	130	Du	10.4	24	-	-	Till	2.47	12- 1-38	S	
48	T13-2e	Mrs. Borg	1900	160	Du	17.5	48	-	-	do.	9.02	12- 1-38	D	
49	T13-2f	Corllis	1900	140	Du	11.8	42	-	-	do.	5.40	12- 1-38	D	Well reported to go dry.
50	T13-2c	Hamel	1934	120	Dr	53	6	-	-	Bedrock	14.99	12- 2-38	-	
51	T13-2e	Silva	1928	150	Dr	72	8	13	-	do.	12	-38	-	Water has yellow color.
52	T13-2f	Thomas Stewart	-	170	Dr	99	6	-	-	do.	34.3	12- 2-38	-	Water rusty.
53	T13-5a	E. R. Blood	1900	190	Du	30	60	30	-	Till	-	-	D	
54	T13-2h	S. Visniewski	-	125	Du	6.2	60 x 24	-	Sand	Ice-contact deposits	2.00	11-30-38	D,S	
55	T13-4c	Louis Eno	1914	160	Du-Dr	40-70	8	40	-	Bedrock	35	-14	D	
56	T13-5d	William Burns	-	190	Du	20.3	36	-	Sand	Ice-contact deposits	13.10	12- 8-38	D,S	Water level 13.96 feet below lsd 4-8-54. Water "hard", "limey".
57	T13-1e	Mrs. Dawson	-	180	Du	18.4	36	-	-	Till	11.70	12- 8-38	-	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Water: Use	Remarks
CHELMSFORD--Continued														
58	T13-1e	Zebierek	1913	137	Du	20.0	48	-	-	Ice-contact deposits	10.70	12- 8-38	I	Well reportedly goes dry in summer.
59	T13-1e	do.	1913	130	Du	14.9	42	-	-	do.	2.70	12- 8-38	-	
60	T13-1c	Mrs. Southwart	-	140	Du	28.7	30	-	-	do.	21.70	12-10-38	-	
61	T13-1b	Mrs. E. Little	1905	140	Du-Dr	36.1-115	30-6	45	-	Bedrock	-	-	-	Water "contains iron".
64	S14-9f	Mrs. S. C. Jones	1915	160	Du	28.5	48	-	-	Ice-contact deposits	23.80	12-13-38	-	
65	S13-3f	E. Ducharne	1908	320	Du	16.2	48	20?	Hardpan	Till	2.40	12-12-38	D	
66	S13-3f	do.	1938	320	Dr	50	6	20	-	Bedrock	8	-38	-	
67	S13-3f	do.	1938	320	Dr	54	6	7	-	do.	8	-38	D	
68	S14-9f	-	-	100.83	Du-Dr	49.6	60-6	-	Sand and gravel	Outwash and alluvium	9.53	7-27-39	O	
69	T13-2d	City of Lowell, Washington Test Well No. 2	1900	103.62	Dn	45.3	2½	-	do.	do.	3.76	8-22-39	O	
71	S14-9j	North Chelmsford Fire District	1949	90	GP	34	24	-	Coarse sand and gravel	do.	6	11- -49	PS	Y 400; dd 19.5. L.
78	S14-9j	City of Lowell, Wannalancit Test Well No. 21	-	102.9	Dn	27	2½	27	Fine sand	do.	-	-	-	L.
85-114	S14-9j	North Chelmsford Fire District	1922	119	Dn	21-34	2½	-	Sand and gravel	Ice-contact deposits	3-6	4-18-44	PS	Y 30 of each well; dd 0. T 48. Water "has slight sulphur taste".
115	S14-9f	City of Lowell, Wannalancit Test Well No. 1	-	97.2	Dn	64	2½	64	Sand	Outwash and alluvium	-	-	-	L.
116	S14-9f	City of Lowell, Wannalancit Test Well No. 2	1941	97.9	Dn	73.0	2½	73	do.	do.	-	-	-	L.
117	S14-9f	City of Lowell, Wannalancit Test Well No. 3	1941	92.6	Dn	51.0	2½	-	do.	do.	-	-	-	L.
118	S14-9f	City of Lowell, Wannalancit Test Well No. 4	1941	97.9	Dn	51.2	2½	-	do.	do.	-	-	-	L.
119	S14-9f	City of Lowell, Wannalancit Test Well No. 5.	1941	94.3	Dn	50.0	2½	-	do.	do.	-	-	-	L.
120	S14-9f	City of Lowell, Wannalancit Test Well No. 6	1941	102.0	Dn	51.0	2½	-	do.	do.	-	-	-	L.
121	S14-9f	City of Lowell, Wannalancit Test Well No. 7	1941	95.4	Dn	42.4	2½	-	do.	do.	-	-	-	L.
122	S14-9f	City of Lowell, Wannalancit Test Well No. 8	1941	94.9	Dn	46.0	2½	-	do.	do.	-	-	-	L.
123	S14-9f	City of Lowell, Wannalancit Test Well No. 9	1941	99.9	Dn	50.0	2½	-	do.	do.	-	-	-	L.
124	S14-9f	City of Lowell, Wannalancit Test Well No. 10	1941	99.3	Dn	70.6	2½	70.6	Sand	Outwash and alluvium	-	-	-	L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
									CHELMSFORD--Continued					
125	S14-9f	City of Lowell, Wannalancit Test Well No. 11	1941	97.8	Dn	55.0	2½	-	Sand	Outwash and alluvium	-	-	-	L.
126	S14-9f	City of Lowell, Wannalancit Test Well No. 12	1941	95.1	Dn	47.3	2½	-	do.	do.	-	-	-	L.
127	S14-9f	City of Lowell, Wannalancit Test Well No. 13	1941	98.1	Dn	48.2	2½	48.2	do.	do.	-	-	-	L.
128	S14-9f	City of Lowell, Wannalancit Test Well No. 14	1941	98.6	Dn	24.5	2½	24.5	do.	do.	-	-	-	L.
129	S14-9f	City of Lowell, Wannalancit Test Well No. 15	1941	96.9	Dn	44.3	2½	44.3	Sand and gravel	do.	-	-	-	L.
130	S14-9f	City of Lowell, Wannalancit Test Well No. 17	1941	100.4	Dn	33.8	2½	-	do.	do.	-	-	-	L.
131	S14-9e	City of Lowell, Wannalancit Test Well No. 18	1941	104.9	Dn	19.4	2½	19.4	Sand	do.	-	-	-	L.
132	S14-9e	City of Lowell, Wannalancit Test Well No. 19	1941	102.2	Dn	28.0	2½	28.0	Sand and gravel	do.	-	-	-	L.
133	S14-9e	City of Lowell, Wannalancit Test Well No. 20	1941	106.1	Dn	16.5	2½	16.5	Sand	do.	-	-	-	L.
134	S14-9e	City of Lowell, Wannalancit Test Well No. 20a	1941	106.1	Dn	19.2	2½	19.2	Sand and gravel	do.	-	-	-	L.
135	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 1	1941	102.8	Dn	93.0	2½	-	do.	do.	13.00	5-27-41	-	L.
136	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 2	1941	98.4	Dn	92.0	2½	-	do.	do.	6.17	5-25-41	-	Y 40; dd 1.38. L.
137	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 3	1941	94.0	Dn	83.0	2½	-	do.	do.	2.75	5-26-41	-	Y 27; dd 14.0. L.
138	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 4	1941	-	Dn	73.5	2½	-	do.	do.	5.50	5-29-41	-	L.
139	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 5	1941	95.5	Dn	82.0	2½	-	do.	do.	5.33	6- 2-41	-	L
140	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 6	1941	-	Dn	32.0	2½	-	do.	do.	6.17	5-28-41	-	L.
141	S14-9j	City of Lowell, Wannalancit Bowler Test Well No. 7	1941	94.6	Dn	62.0	2½	-	do.	do.	-	-	-	Y 17½; dd 2.1. L.
142-156	T13-1j	Chelmsford Water District	1912-1913	100	Dn	38-42	2½	-	Gravel	do.	2	4- -44	PS	Y 15 of each well; dd 0. T 48.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year com-pleted	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measure-ment	Use	
CHELMSFORD--Continued														
157-166	T13-1j	Chelmsford Water District	1940	100	Dn	29-31	2½	-	Gravel	Outwash and alluvium	2	4- -44	PS	Y 33-40; dd 0. T 48.
167-181	T13-1j	do.	1949	100	Dn	31-40	2½	-	-	do.	-	-	PS	
182-196	T13-1j	do.	1950	100	Dn	30-40	2½	-	-	do.	-	-	PS	
197-201	T13-1j	do.	1947	100	Dn	30-40	2½	-	-	do.	-	-	-	Y 40-45.
209-220	T13-2a	Commonwealth of Mass. Bridge C-8-13	-	103.2-121.7	Dn	36.0-55.0	2½	38.0-55.0	-	-	.0-17.0	-	-	L.
221-230	T13-2d	Commonwealth of Mass. Bridge C-8-16	-	100.5-101.0	Dn	48.2-66.0	2½	-	-	-	-	-	-	L.
231-240	T13-1b	Commonwealth of Mass. Bridge C-8-17	-	129.2-139.1	Dn	15.5-41.0	2½	15.5-41.0	-	-	-	-	-	L.
242	T13-2g	Harold Bettencourt	1950	140	Du	6.2	36	-	Gravelly sand	Ice-contact deposits	4.29	4- 7-54	D	
243	T13-2b	Stephen Kinnal	-	130	Du	13.2	-	-	Sand	do.	8.80	8-20-54	-	
244	S13-3c	Henry Becker	1947	170	Dr	73	6	25	-	Bedrock	22.01	6-16-54	D	C. T 54.
245	T13-4c	Cross Electric Co.	-	160	Du	15.5	18	-	Sand and gravel	Ice-contact deposits	12.65	8-12-54	-	
246	T13-2b	City of Lowell, Hydraulic No. 10	1895	100	Dn	33	2½	-	Sand	Outwash and alluvium	-	-	-	L.
247	T13-2b	City of Lowell, Hydraulic No. 11	1895	100	Dn	48	2½	-	Sand and clay	do.	-	-	-	L.
248	T13-2b	City of Lowell, Hydraulic No. 12	1895	100	Dn	48	2½	-	Sand and gravel	do.	-	-	-	L.
250	T13-2b	City of Lowell, Hydraulic No. 14	1895	100	Dn	62	2½	-	do.	do.	-	-	-	L.
251	T13-2b	City of Lowell, Hydraulic No. 15	1895	100	Dn	46	2½	-	do.	do.	-	-	-	L.
252	T13-2e	City of Lowell, Hydraulic No. 16	1895	100	Dn	43	2½	-	Sand	do.	-	-	-	L.
253	T13-2d	City of Lowell, Hydraulic No. 17	1895	100	Dn	40	2½	-	do.	do.	-	-	-	L.
258	T13-2d	City of Lowell, Hydraulic No. 22	1895	100	Dn	38	2½	-	do.	do.	-	-	-	L.
259	T13-2d	City of Lowell, Hydraulic No. 23	1895	100	Dn	86	2½	-	Sand and gravel	do.	-	-	-	L.
260	T13-2d	City of Lowell, Hydraulic No. 24	1895	100	Dn	71	2½	-	do.	do.	-	-	-	L.
262	T13-2d	City of Lowell, Hydraulic No. 26	1895	100	Dn	67	2½	-	do.	do.	-	-	-	L.
264	T13-2d	City of Lowell, Hydraulic No. 28	1895	100	Dn	70	2½	-	do.	do.	-	-	-	L.
265	T13-1f	Chelmsford Water District	1953	110	Dn	87.0	2½	-	Sand	do.	-	-	-	L.
266	T13-1c	do.	1953	120	Dn	40.0	2½	-	do.	Ice-contact deposits	-	-	-	L.
267	T13-1b	do.	1953	120	Dn	28.0	2½	28.0	do.	do.	1	3-26-53	-	L.
268	T13-1b	do.	1953	110	Dn	49.9	2½	-	Sand and gravel	do.	2.1	3-27-53	-	Y 81; dd 0.9. L.
269	T13-1b	do.	1953	120	Dn	24.8	2½	-	Sand	do.	5	3-30-53	-	L.
270	T13-1b	do.	1953	120	Dn	18.3	2½	-	do.	do.	1.33	4- 1-53	-	L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
CHELMSFORD--Continued														
271	T13-1b	Chelmsford Water District	1953	120	Dn	20.7	2½	20.7	Sand	Ice-contact deposits	-	-	-	L.
272	T13-1j	do.	1953	130	Dn	18.0	2½	18.0	do.	do.	-	-	-	L.
273	T13-1j	do.	1953	120	Dn	26.6	2½	26.6	do.	Outwash and alluvium	3.17	4- 4-53	-	L.
274	T13-1j	do.	1953	110	Dn	39.0	2½	39.0	Sand and gravel	Ice-contact deposits	-	-	-	L.
275	T13-1j	do.	1953	110	Dn	49.4	2½	-	do.	do.	3	4- 7-53	-	Y 80; dd 0.75. L.
276	T13-1j	do.	1953	110	Dn	26.3	2½	-	do.	do.	-	-	-	L.
277	T13-2d	do.	1953	110	Dn	64.3	2½	64.3	do.	do.	6.42	4-15-53	-	L.
278	T13-1c	do.	1953	110	Dn	98.2	2½	-	Sand	Outwash and alluvium	-	-	-	L.
279	T13-2d	do.	1953	110	Dn	50.0	2½	50.0	Sand and gravel	do.	.92	4-18-53	-	L
280	T13-1j	do.	1954	110	GP	45	24	-	do.	Ice-contact deposits	-	-	-	Y 550. C. L. T 50. Well at site of Chelmsford 275.
281-290	T13-2d	Commonwealth of Mass Bridge C-8-14	-	105.3-114.4	Dn	21.7-32.0	2½	21.7-32.0	-	-	3.0-12.0	-	-	L.
291	T13-1j	Chelmsford Water District	-	110	Dn	40	2½	-	-	Ice-contact deposits	1.88	4-20-53	-	L.
DRACUT														
4	T14-7c	Charbonneau	-	170	Du	13	48	-	Sand and gravel	Till	4	10-15-38	D,S	About 7,000 gpd pumped. T 55.
5	T14-4j	J. C. Richardson	1928	95	Du	10	480 x 240	-	Sand	Outwash and alluvium	-	-	D,S	Y 200.
6	T14-4h	do.	1890	155	Dr	135	8-6	-	-	Bedrock	-	-	-	Abandoned because of low yield.
8	T14-4h	Phaneuf	1937	165	Dr	135	6	10	-	do.	8	-37	D	
9	T14-5h	Guy Richardson	1932	155	Dr	137	6	16	-	do.	15	-38	D,I	Y 20; dd 75. T 46.
10	T14-7c	Rousseau	1925	190	Dr	109	6	6	-	do.	-	-	D	Water level drawn below intake if well pumped 5 gpm for 1 hour.
13	T14-4h	Mrs. Bryant	-	165	Du-Dr	110	6	-	-	do.	5	-38	-	Water "very hard".
14	T14-5j	Warren Fox	1890	140	Du-Dr	50	6	25	-	do.	-	-	-	
15	S14-6f	Albert Frazier	1912& 1936	150	Du	18 & 30	36 & 36	-	Gray sand	Till	12	-38	D	Two dug wells.
16	S14-6f	G. Makes	1938	150	Dn	12	1¾	-	Sand	do.	-	-	D	
18	T14-7c	W. G. Kinghorn	1925	170	Du-Dr	16 & 96	6	16	-	Bedrock	-	-	D,S	
22	T14-9b	Carl's Greenhouse	1915	60	Dr	47	8	18	-	do.	21	-38	D,Ir	
23	T14-9b	E. M. Rubican	1933	60	Dr	57	8	-	-	do.	20	-33	D	About 1,800 gpd pumped.
24	T14-9b	Arthur Connelly	-	60	Dr	52	6	-	-	do.	15	-36	D	
25	T14-9b	Quine	1930	60	Dr	66	6	20	-	do.	-	-	D	
26	T14-9c	Mrs. Arnold	1930	65	Dr	122	8	0	-	do.	-	-	D	
27	T14-9b	Gemmell	1933	60	Du	23	48	12	-	do.	18	-	D	
29	T14-9b	R. Rhombarg	1915	100	Dr	65	6	-	-	do.	-	-	D,S	Well flowed when drilled.
31	T14-9b	Mrs. E. Sulham	1938	70	Dr	50	8	6	-	do.	28	-38	D	Y 25.
33	T14-6c	K. Brox	1934	140	Du	14	48	14	Sand and gravel	Till	-	-	D,S	
35	T14-4j	Stanley Lachute	-	160	Du	30	48	-	-	do.	-	-	I	Water forms scale on boilers. Water "high in iron".
36	T14-9b	J. J. McManmon	-	55	Du	30-35	24	-	-	Outwash and alluvium	-	-	D	"Hardpan" at bottom of well.
38	T14-9c	Joseph Guilmett	1932	60	Dr	114	8-6	60	-	Bedrock	6-3	-38	D	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

DRACUT--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Water: Use	Remarks
40	T14-9c	J. L. McPherson	1930	70	Dr	109	6	85	-	Bedrock	-	-	D,S,I	Y 10; dd 36.
41	T14-9c	Arthur Fraser	1926	55	Du	30	24	-	-	Outwash and alluvium	5	-38	D	
42	T14-6c	Abraham Brox	1935	100	Du	12-10	48	-	Gravel	Ice-contact deposits	2	-38	D,S,I	Y 44 from two wells connected to one pump.
43	T14-6b	Clark Richardson	-	180	Du	12.1	36	-	Quicksand	do.	3.87	10-25-38	D	"Dug through clay to quicksand".
44	T14-5e	William Gaudette	-	140	Du	8.5	18	-	Sand	Outwash and alluvium	1.44	10-25-38	D	Water "hard".
45	T14-5f	F. B. Bryant	1915	250	Dr	64	6-4	10	-	Bedrock	3.85	10-25-38	D,S	Y 12.
46	T14-5f	do.	-	250	Du	11	72	-	Blue clay	Till	5	-38	S	
47	T14-6b	Martha A. Richardson	1938	170	Du	10	48	-	-	Ice-contact deposits	7	-38	D,S	
49	T14-3j	John Cislik	1933	180	Du	24	48	21	-	Till	15	-38	S	
50	T14-3f	Mrs. Fred Cornechu	-	200	Du	13.9	36	-	-	do.	5.25	10-26-38	-	
51	T14-6e	A. Brochu	1900	185	Du	12.4	24	-	-	do.	5.9	10-26-38	D,S	
52	T14-5d	Charles Kleczkowski	-	165	Du	14.9	48	-	-	do.	8	10-26-38	D,S	
53	T14-6c	Edward Bailey	-	130	Du	12.2	36	-	-	do.	4.55	10-26-38	D	
55	T14-4f	Stanley Jarboski	1923	195	Du	13.3	48	-	Sand	do.	6.90	10-26-38	D,S	
56	T14-5e	E. Fox	1928	180	Du	8	48	8	-	do.	5	-38	D,S	
57	T14-5e	do.	1937	170	Du	22	72	-	Gravel	do.	8	-38	-	
58	T14-5e	do.	1938	190	Du	24	72	-	do.	do.	15	-38	S	
59	T14-4e	Mrs. F. W. Robinson	1918	150	Du	14.7	48	15	-	do.	10.0	10-26-38	D,S	
60	T14-9c	Harry Johnson	-	60	Du	10.0	24	-	Sand	Ice-contact deposits	.54	12-21-38	D,S	Water seeps through rock wall of well and discharges at surface.
61	T14-9b	L. Garlick	1916	60	Du	30	72	30	Gravel	Outwash and alluvium	-	-	D	
62	T14-5d	F. Allard	-	240	Du	12	-	-	-	Till	8	-38	D	
63	T14-4f	Dracut Water Supply District	1941	130	GP	35	24	-	Gravel	Ice-contact deposits	19.3	1-11-55	PS	Y 300; dd 9. C. T 49.
64	T14-4f	do.	1949	130	GP	26	12	35	do.	do.	21	12-21-50	PS	Y 150; dd 5.
65	T14-4h	R. H. DuPuis	-	120	Du	4.35	12	-	-	Till	.50	12-21-50	D	Water "tastes and stains like iron".
66	T14-8a	Merrimac Woolen Co. Test Well No. 1	1940	70	Dn	29.5	2½	29.5	Sand and gravel	Ice-contact deposits	.8	-40	-	L.
67	T14-8a	Merrimac Woolen Co. Test Well No. 2	1940	70	Dn	20.0	2½	20.0	do.	do.	2.0	-40	-	L.
68	T14-8a	Merrimac Woolen Co. Test Well No. 3	1940	70	Dn	30.0	2½	30.0	-	do.	-	-	-	L.
69	T14-8a	Merrimac Woolen Co. Test Well No. 4	1940	70	Dn	33.0	2½	-	Sand and gravel	do.	.6	-40	-	L.
70	T14-8a	Merrimac Woolen Co. Test Well No. 5	1940	75	Dn	29.5	2½	29.5	Sand	do.	2.0	-40	-	L.
71	T14-8a	Merrimac Woolen Co. Test Well No. 6	1940	70	Dn	29.0	2½	29.0	Sand and gravel	do.	4.5	-40	-	L.
72	T14-8a	Merrimac Woolen Co. Test Well No. 7	1940	70	Dn	31.0	2½	29.0	do.	do.	3.5	-40	-	L.
73	T14-8a	Dracut Water Supply District, Test Well 6A	1941	70	Dn	8.5	2½	-	-	do.	-	-	-	L.
74	T14-4g	Dracut Water Supply District	1937	153.29	Dn	82	2½	82	Sand and gravel	Outwash and alluvium	4	-38	PS	L.
76-110	T14-4d	do.	1937	153.29	Dn	25-28	2½	-	do.	do.	4	-38	PS	Y 250; dd 21.5

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
									DRACUT--Continued					
111-120	T14-5g	Dracut Water Supply District	-	107.6	Dn	20-28	2½	-	Sand and gravel	Outwash and alluvium	0	-28	PS	Y 250; dd 20-28 (wells pumped below intake). L.
121-136	T14-5g	do.	-	107.6	Dn	20-28	4 x 4	-	do.	do.	0	-38	PS	
137-144	T14-4d	do.	1900	149.6	Dn	20	2½	-	Sand	do.	0	-30	PS	L.
145	T14-5j	J. F. Callahan	-	170	Du	13.6	18	-	-	Till	8.28	2- 3-39	D,O	
146	T14-3f	J. Traverner	1950	170	Dr	187	6	50+?	-	Bedrock	-	-	D	Y 9.
147	T14-3f	do.	-	170	Du	19.9	-	-	-	Till	8.12	4-20-54	D	
148	T14-3f	-	-	200	Du	15.3	24	-	-	do.	2.72	4-20-54	D	Well reported dry in 7-53.
149	T14-3j	-	-	130	Du	9.5	36	-	-	do.	2.51	4-20-54	D	
150	T14-3j	E. R. Dufresne	1949	160	Dr	173	6	0	-	Bedrock	-	-	D	Y 4. C. T 54.
151	T14-3j	-	-	120	Du	6.6	40	-	-	Till	.34	4-22-54	-	
152	T14-3j	Frank Giaquinta	-	150	Dr	97	-	-	-	Bedrock	-	-	D	Y 6.
153	T14-3j	Griffin	1953	160	Dr	108	6	-	-	do.	-	-	D	Y 3-4.
154	T14-3j	Collier	-	160	Dr	65	6	-	-	do.	2.22	4-22-54	D	
156	T14-6c	Brox	1953	100	Du	14.8	40	-	Sand	Ice-contact deposits	7.83	4-22-54	-	
157	T14-6c	do.	-	130	Dn	23.8	2½	-	-	do.	-	-	-	No water in well when scheduled. Bottom hard--may be bedrock.
159	T14-3j	Downs	-	140	Dr	78	6	-	-	Bedrock	-	-	D	Y 1½.
160	T14-3j	J. Lebrun	1933	160	Du	19.9	30	-	"Blue clay"	Till	2.77	4-29-54	D,S	Well supplied water for 3,500 hens and 1,500 chickens. C. T 43.
161	T14-6a	-	-	190	Du	3	72	-	Sand?	Outwash and alluvium	.00	5- 6-54	-	
162	T14-6b	-	-	190	Du	-	360	-	-	Till	.00	5- 6-54	-	
163	T14-6b	Frank Kerapka	-	200	Du	25-30	600	-	Gravelly	do.	5-6	5- 6-54	S,Ir	
164	T14-6f	H. T. Taplin	1953	180	Du	8½	180	-	-	do.	.00	5- 6-54	D,S	
165	T14-6b	J. H. Molloy	-	190	Du-Dn	35-40	-	-	Sand?	Ice-contact deposits	-	-	D	Dug well went "dry" in 1953.
166	T14-9c	E. Ainesworth	-	60	Du	35	36	-	Silty sand	do.	18.24	5- 7-54	D	
167	T14-9c	do.	1954	60	Dr	228	6	85	-	Bedrock	19.21	5- 7-54	D	Y 5.
168	T14-9b	-	1954	90	Dr	107	6	10	-	do.	1.85	5-17-54	-	Y 6.
170	T14-6e	John Juscaz	1951	145	Du	14	24	-	Sand and gravel	Ice-contact deposits	5.73	5-13-54	D	
171	T14-5b	J. P. Condon Corp.	-	140	Dr	50	8	15	-	Bedrock	3-4	-	I	
174	T14-6a	-	-	270	Du	16.1	48	-	-	Till	2.77	5-14-54	D	
175	T14-6e	Alex Ogonowski	-	140	Du	10.4	36	-	Pebbly sand	Ice-contact deposits	5.13	5-14-54	D,S	Water forms deposit on pipes.
176	T14-6h	Spelczar	1924	150	Dr	145	6	30	-	Bedrock	15	-	D,S	Y 12.
177	T14-9c	Henry Clough	1932	70	Du	20.0	36	-	Silty sand	Outwash and alluvium	12.23	5-17-54	D,S	Water enters well at contact between silty sand and underlying "hardpan".
178	T14-5d	Walter Sosnowy	-	250	Du	13.5	30	13½	-	Bedrock	2.22	5-18-54	D,S	Water reportedly "spurts" into well from cracks in rock at bottom of well.
179	T14-5d	do.	-	250	Du	15.5	36	-	-	Till	4.59	5-18-54	D	
180	T14-5b	Maguire	1949	210	Du	12	40	-	Fine sand	Outwash and alluvium	0	5-18-54	D,S	
181	T14-9b	Haliff	1954	80	Dr	61	6	8	-	Bedrock	4.47	5-24-54	D	Y 2.
182	T14-9c	Raymond Eile	1954	70	Du	28	-	28?	Sand	Outwash and alluvium	9.41	5-24-54	D	
183	T14-9b	L. J. LaPorte	-	90	Du	17½	24	-	-	Till?	3-4	-	D	
184	T14-9a	Edward Sheehan	1952	100	Du	25.9	40	-	Sand and gravel	Ice-contact deposits	6.84	5-24-54	D	

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Water: Use	Remarks
								DRACUT--Continued						
185	T14-9a	Joseph Sheehan	1930	100	Dr	95	6	-	Gravel?	Ice-contact deposits?	18.10	5-24-54	D	
186	T14-9a	F. L. Vinal	1947	130	Dr	220	6	175?	-	Bedrock	45	-47	D	Y 36+.
187	T14-9a	do.	-	130	Du	25.3	24	-	-	Till	6.32	5-25-54	D	
189	T14-9a	Frank Myers	1953	70	Du	23	36	-	Gravel	Ice-contact deposits	-	-	D	Water level reportedly rose 2 feet when gravel underlying clay was struck in digging the well.
190	T14-4d	Alexander McGillvray	1943	180	Dr	105	6	3	-	Bedrock	16	2- -43	D	Y 7. C. T 53.
191	T14-4d	-	1954	180	Dr	115	6	22	-	do.	10.90	6-10-54	D	Y 9; dd 15½.
192	T14-8c	H. S. Dupee	1947	160	Dr	189	6	160?	-	do.	22.93	6-14-54	D,I	Y 20. C. T 52.
193	T14-7c	John Kaczmarski	-	110	Du	25	24	-	Sand and gravel	Ice-contact deposits	7.32	7- 2-54	D	
								LOWELL						
1	T14-8e	Brockleman Bros.	1932	80	Dr	230	8	20	-	Bedrock	-	-	I	Y 25. Water "soft". T 52. About 20,000 gpd pumped.
2	T14-8d	Pilling Shoe Co.	1908	100	Dr	160	6	10	-	do.	-	-	I	Water reportedly flows into pump. "Too much lime" in water for boiler use. About 1,800 gpd used.
3	T14-7f	Gage Ice Co.	1935	105	Dn	23-25	3	-	Gravel	Outwash and alluvium	-	-	I	Y 35-40 of 3 wells. See also Lowell 143-174.
4	T14-7f	New England and Southern Mills, No. 1	-	102.26	Du	22.3	60-144	-	-	do.	8.37	4-14-39	I,O	Destroyed 1952.
5	T14-8h	W. J. Burbeck Co.	1915	130	Dr	557	8	17	-	Bedrock	18-30	-	I	Y 130. Water "contains iron", has muddy color. Well must be cleaned out every 6 months.
6	T13-2a	John Kydd	1938	135	Dr	235	6	50	-	do.	-	-	I	Y 41. Water treated for boiler use. T 42.
8	T14-8d	H. P. Hood & Sons	1923	100	Dr	220	8	12	-	do.	-	-	I	L.
9	T14-8g	Roark Estate	1858	170	Du	27.6	24	-	Sand	Till	7.50	4-24-39	-	
10	T14-8e	Swift & Co.	1908	95	Du-Dr	152	36 x 48-6	-	-	Bedrock	-	-	I	Y 15-20. About 5,800 gpd pumped. T 55.
11	T14-7f	Jeans Laundry Co.	1908	100	Dn	30	2	-	Hardpan	Till	-	-	I	Y 8 of 6 driven wells.
12	T14-8d	Highland Laundry	-	110	Dr	146	8-6	12	-	Bedrock	4	-38	-	Driller lost bit in well and well never completed.
14	T14-8j	Rogers Hall School	1815	157.78	Du	29.7	24	-	Sand	Till	7.95	4-17-39	D,O	Y 6; dd 11.
15	T14-8j	Robert Catherwood & Sons	1903	125	Dr	40	-	-	-	Bedrock	-	-	I	
16	T14-8d	Lowell Gas and Light Co.	1912	105	Dr	250	6	6	-	do.	-	-	I	
17	T14-8a	Lowell Textile Inst.	1900	100	Dr	225	8-6	-	-	do.	-	-	I	Y 12.
18	T14-7f	Mrs. Logan	1838	145	Du	36.6	24	-	Sand	Ice-contact deposits	28.07	10-19-38	D	
20	T14-8e	Carbonizing Co.	1900	95	Dr	220	6	17	-	Bedrock	-	-	-	
22	T14-8g	Shaw Paper Co.	-	115	Dr	250.2	6	-	-	do.	7.02	11-16-38	-	
24	T14-7a	L. D. Rogers	1935	190	Du	12.3	24	12	-	Till	2.20	12-13-38	D	Well said to go dry about the beginning of July.
25	S14-9f	P. Hankinson	1890	150	Du	24	-	24	-	Ice-contact deposits	16	-38	D	
26	S14-9f	Alfred Cimon	-	102.26	Dn	15.5	1¼	-	-	do.	3.75	12-14-38	O	
27	T14-7e	Collier	1900	120	Du	4.3	120	-	-	do.	2.10	12-15-38	-	T 51.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
		LOWELL--Continued												
28	T14-7e	J. A. Langois	1938	90	Dn	20	1½	-	Gravel	Outwash and alluvium	14-15	-38	D	
29	T14-7f	Miller	1919	90	Du	12	48	-	Sand and gravel	do.	8-9	-38	-	
30	T14-7f	Beaudoin	1923	105	Du-Dr	56	6	14	-	Bedrock	20	-38	-	
31	T14-7f	Mrs. Sullivan	1923	100	Du	10.5	24	11	-	Till	5.10	12-15-38	-	
32	T14-7e	Langois	-	100	Dn	-	2	-	-	Outwash and alluvium	-	-	D	
33	T14-7e	Thomas Varnum	1838	101.83	Du	13.0	27	-	-	do.	5.3	12-16-38	0	
34	T14-7d	Carter	1918	115	Du	16.3	60	-	Sand and gravel	do.	8.9	12-16-38	D,S	
35	T14-7d	do.	1918	120	Du	8.0	72	-	-	do.	2.90	12-16-38	-	
36	T14-7d	Osborn Smith	1937	150	Du-Dr	73	6	23	-	Bedrock	30-40	12-16-38	D	
40	T14-7d	City of Lowell, Boulevard Test Well No. 22	-	93	Dn	27.4	3	-	-	Outwash and alluvium	7.89	7-27-39	-	
41	T13-2a	City of Lowell, Cook Test Well No. 3	1900	105.63	Dn	53.3	2	64	-	do	8.68	8-22-39	0	
42	T14-7d	George Banakos	-	100	Dn	8.8	2	-	-	do.	+.87	6- 7-39	-	
43	T14-7d	City of Lowell, Boulevard Test Well No. 26	-	101.06	Dn	32.4	2½	-	Sand and gravel	do.	11.42	8-13-40	0	
44	T14-7f	Lowell General Hospital No. 1	1942	120	Dr	500	10-8	30	-	Bedrock	40	12- -50	PS	Y 85; dd 60. Well has been pumped at 110 gpm. T 50.
45	T14-7f	Lowell General Hospital No. 2	1950	120	Dr	500	10-8	40	-	do.	40	12- -50	PS	Y 85; dd 60. Well has been pumped at 90 gpm. T 50.
48	T13-2a	Harvard Brewing Co.	1949	105	GP	57	24	-	Sand	Outwash and alluvium	10-39	-49	I	Y 200; dd 12, when nearby well Lowell 96 is pumping. T 48 in winter, T 52 in summer. Located at site of test well Lowell 71.
49	T13-2b	do.	1945	110	Dn	41.0	2½	-	Sand	Ice-contact deposits	-	-	I	Y 45 in 1945. Y 6 in 1950.
50	T13-2b	do.	1945	110	Dn	40.0	2½	-	do.	do.	-	-	I	Y 35 in 1945. Y 10 in 1950.
51	T13-2b	do.	1945	110	Dn	41.4	2½	-	do.	do.	-	-	I	Y 18 in 1945. Y 10 in 1950.
52	T13-2b	do.	1945	110	Dn	60.6	2½	-	do.	do.	-	-	I	Y 40 in 1945. Y 22 in 1950.
53	T13-2b	do.	1945	110	Dn	36.0	2½	-	do.	do.	-	-	I	Y 40 in 1945. Y 25 in 1950.
54	T13-2b	do.	1947	110	Dn	36.3	2½	-	do.	do.	-	-	I	Y 37½ in 1947. Y 30 in 1950.
55	T13-2b	do.	1947	110	Dn	52.0	2½	-	do.	do.	-	-	I	Y 45 in 1947. Y 30 in 1950.
56	T13-2b	do.	1947	110	Dn	53.7	2½	-	do.	do.	-	-	I	Y 50 in 1947. Y 30 in 1950.
57	T13-2b	do.	1947	110	Dn	41.0	2½	-	do.	do.	-	-	I	Y 50 in 1947. Y 40 in 1950.
58	T13-2b	do.	1947	110	Dn	44.0	2½	-	do.	do.	-	-	I	Y 50 in 1947. Y 45 in 1950.
59	T13-2b	do	1947	110	Dn	60.0	2½	70	do.	do.	-	-	I	Y 30 in 1947. Y 40 in 1950.
60	T13-2b	do.	1947	110	Dn	58.7	2½	-	do.	do.	-	-	I	Y 50 in 1947. Y 40 in 1950.
61	T13-2b	do.	1947	110	Dn	54.0	2½	-	do.	do.	-	-	I	Y 45 in 1947. Y 40 in 1950.
62	T13-2b	do.	1947	110	Dn	56.0	2½	-	do.	do.	-	-	I	Y 50 in 1947. Y 35 in 1950.
63	T13-2b	do.	1947	110	Dn	52.0	2½	-	do.	do.	-	-	I	Y 37½ in 1947. Y 20 in 1950.
64	T13-2b	do.	1949	110	Dn	62.7	2½	-	do.	do.	-	-	-	Y 25. L.
65	T13-2b	do.	1949	110	Dn	60.0	2½	-	do.	do.	-	-	-	Drawdown 2.4 after pumping Lowell 64 for 30 hours at 25 gpm.
66	T13-2a	do.	1949	110	Dn	72.0	2½	-	do.	do.	-	-	-	Y 30. L.
67	T13-2a	do.	1949	110	Dn	70.0	2½	-	do.	do.	-	-	-	Drawdown 4.5 after pumping Lowell 66 for 5 hours at 30 gpm.
68	T13-2b	do.	1949	110	Dn	55.2	2½	-	do.	do.	-	-	-	L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
									LOWELL--Continued					
69	T13-2b	Harvard Brewing Co.	1949	110	Dn	65.2	2½	-	Sand	Ice-contact deposits	-	-	-	L.
70	T13-2b	do.	1949	110	Dn	68.0	2½	-	do.	do.	-	-	-	L.
71	T13-2a	do.	1949	105	Dn	57.2	2½	-	Sand and gravel	do.	-	-	-	Y 28. L. Lowell 48 located at site of this test well.
72	T13-2a	do.	1949	110	Dn	52.0	2½	-	do.	do.	-	-	-	Drawdown 1.5 after pumping Lowell 71 for 6½ hours at 28 gpm.
75	T13-2b	do.	1946	110	Dn	45.0	2½	-	Very fine sand	do.	-	-	-	
76	T13-2b	do.	1946	110	Dn	59.0	2½	59	do.	do.	-	-	-	
77	T13-2b	do.	1937	110	Dn	61.0	2½	-	Coarse sand and gravel	do.	-	-	-	Y 40. L.
78	T13-2b	do.	1937	110	Dn	60.0	2½	-	do.	do.	-	-	-	Y 30. L.
79	T13-2b	do.	1937	110	Dn	60.0	2½	-	do.	do.	-	-	-	Y 40 at 38 feet. Y 20 at 60 feet. L.
80	T13-2b	do.	1937	110	Dn	56.0	2½	-	do.	do.	-	-	-	Y 35. L.
81	T13-2b	do.	1937	11	Dn	53.0	2½	-	Sand and gravel	do.	-	-	-	Y 20. L.
82	T13-2b	do.	1937	110	Dn	60.0	2½	-	Coarse sand and gravel	do.	-	-	-	Y 50. L.
83	T13-2b	do.	1935	110	Dn	49.4	2½	66	Sand and gravel	do.	-	-	-	Y 30. L.
84	T13-2b	do.	1935	110	Dn	44.6	2½	-	Fine sand	do.	-	-	-	Y 30.
85	T13-2b	do.	1935	110	Dn	78.2	2½	-	do.	do.	-	-	-	Y 25.
86	T13-2b	do.	1935	110	Dn	42.3	2½	-	Sand	do.	-	-	-	Y 25.
87	T13-2b	do.	1935	110	Dn	86.0	2½	86	Fine sand	do.	-	-	-	
88	T13-2b	do.	1935	110	Dn	33.6	2½	-	Sand	do.	-	-	-	Y 40.
89	T13-2b	do.	1935	110	Dn	37.2	2½	-	do.	do.	-	-	-	Y 40.
90	T13-2b	do.	1935	110	Dn	42.0	2½	-	do.	do.	-	-	-	
91	T13-2b	do.	-	110	Dn	86.0	2½	86	do.	do.	-	-	-	L.
92	T13-2b	do.	-	110	Dn	38.0	2½	-	do.	do.	-	-	-	L.
93	T13-2b	do.	-	110	Dn	40.0	2½	-	do.	do.	-	-	-	L.
94	T13-2b	do.	-	110	Dn	58.0	2½	-	Medium sand	do.	-	-	-	L.
96	T13-2a	City of Lowell	1938	100	GP	75	12	-	Gravel and sand	Outwash and alluvium	9	-38	PS	Y 320; dd 16. L.
97	T13-2a	do.	1943	100	GP	47	12	-	do.	do.	-	-	PS	
104	T13-2a	City of Lowell, Cook Test Well No. 1	1941	100	Dn	64	2½	64	Sand and gravel	do.	5.3	-41	-	L.
105	T13-2a	City of Lowell, Cook Test Well No. 2	1941	100	Dn	49	2½	49	do.	do.	3.6	-41	-	L.
106	T13-2a	City of Lowell, Cook Test Well No. 3	1941	100	Dn	46	2½	46	do.	do.	3.3	-41	-	Y 25; dd 5.
107	T13-2a	City of Lowell, Cook Test Well No. 4	1941	100	Dn	70	2½	-	do.	do.	5	-41	-	Y 55; dd 2. Not located on map.
108	T14-7d	City of Lowell, Boulevard Test Well No. 3B	1941	100	Dn	47	2½	47	do.	do.	24.3	-41	-	L.
111	T14-7d	City of Lowell, Boulevard Test Well No. 6B	1941	100	Dn	55	2½	55	do.	do.	-	-	-	Not located on map.
112	T14-7d	City of Lowell, Chapman Well at Boulevard Well Field	1942	100	GP	70	12	70	do.	do.	17	8- -42	PS	Y 400; dd 4.8. Water high in iron, has sulfurous odor. L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
									LOWELL--Continued					
113	T13-1c	City of Lowell, Black Brook, No. 1	1948	105	GP	54	24	86	Sand and gravel	Ice-contact deposits	-	-	PS	Y 420. L.
114	T13-1c	City of Lowell, Black Brook, No. 2	1948	105	GP	51	24	72	do.	do.	-	-	PS	Y 420. L.
115	T13-1b	City of Lowell, Black Brook, No. 3	1948	105	GP	66	24	75	do.	do.	-	-	PS	Y 420. L.
116	T13-1b	City of Lowell, Black Brook, No. 4	1948	105	GP	55	24	-	do.	do.	17.4	1-11-55	PS	Y 630. C. L. T 49.
117-142	T13-2b	Harvard Brewing Co.	1897-1935	95	Dn	36-74	2½ & 6	-	Gravel	do.	-	-	I	Y 6-40.
143-174	T14-7f	Gage Ice Co.	-	100	Dn	25	2½	-	do.	Outwash and alluvium	9	12- -50	I	Lowell 143-146 used for manufacturing ice, are pumped continuously at rate of about 26,000 gpd. Lowell 147-174, used for cooling, are pumped intermittently in summer at maximum rate of about 84,000 gpd. T 62.
175-761	T14-7d	City of Lowell, Boulevard Well Field	1900-1947	105	Dn	25-62	2½	-	do.	do.	24	4- -51	PS	Reported pumpage about 3.5 mgd in 1954.
762-783	T13-2a, b	City of Lowell, Cook Well Nos. 37-58	-	100	Dn	45-66	2½	-	Sand	do.	7.5-25.8	-42	PS	
784	T13-2b	Harvard Brewing Co.	-	100	-	-	-	-	-	Ice-contact deposits	19.8	9- 6-48	-	Harvard Brewing Co. observation well.
785	T13-2b	do.	-	100	-	-	-	-	-	do.	19	9-22-48	-	Do.
794	T14-7h	City of Lowell, Bowers No. B	-	100	GP	35	24	72	Sand and gravel	Outwash and alluvium	4	-	PS	Y 420; dd 20 when Lowell 795 pumping.
795	T14-7h	City of Lowell, Bowers No. 1	1952	100	GP	55	24	70	do.	do.	4	-	PS	Y 620; dd 17.
796	T14-7h	City of Lowell, Hadley No. 4	1950	90	GP	50	24	73	do.	do.	-	-	PS	Y 420.
797	T14-7h	City of Lowell, Hadley No. 6	1950	90	GP	50	24	74	do.	do.	-	-	PS	Y 620.
798-808	T14-8b	Commonwealth of Mass. Bridge L-15-58	-	53.2-72.3	Dn	3.6-51.7	2½	27.5-51.7	do.	do.	-	-	-	L.
809-828	T14-8b	Commonwealth of Mass. Bridge L-15-59	-	34.5-95.7	Dn	5.0-62.0	2½	5.0-62.0	do.	Till	-	-	-	L.
830-863	T14-7h	Boston & Maine RR	1917	84.3-102.9	Dn	7.1-42.0	2½	7.1-35.6	Sand	Outwash and alluvium	-	-	-	L.
864-877	T14-8f	Commonwealth of Mass. Bridge L-15-60	1952	71.2-74.1	Dn	5.0-46.5	2½	27.5-46.5	Fine sand, gravel, boulders	Till	-	-	-	L.
878	T14-8e	U. S. Engineers	1941	67.0	-	30.0	-	-	Sand, silt, pebbles	Outwash and alluvium	-	-	-	L.
879	T14-8e	do.	1941	66.3	-	30.0	-	-	do.	do.	-	-	-	L.
880	T14-8e	do.	1941	67.3	-	24.0	-	-	do.	do.	-	-	-	L.
881	T14-8e	do.	1941	61.0	-	30.0	-	-	Sand and gravel	do.	-	-	-	L.
882	T14-8e	do.	1941	71.0	-	30.0	-	-	do.	do.	-	-	-	L.
883	T14-8b	do.	1941	64.7	-	20.0	-	-	Sand, silt, and gravel	do.	-	-	-	L.
884	T14-8b	do.	1941	64.1	-	30.0	-	-	do.	do.	-	-	-	L.
885	T14-8b	do.	1941	66.7	-	25.0	-	-	Sand and silt	do.	-	-	-	L.
886	T14-8a	do.	1941	67.5	-	30.3	-	20.0	Silt, sand, and gravel	Till	-	-	-	L.

Table 2.--Records of selected wells and test holes in the Lowell area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material: Character	Principal water-bearing material: Geologic unit	Water: Level	Water: Date of measurement	Use	Remarks
							LOWELL--Continued							
887	T14-2a	City of Lowell, Cook No. 6	1895	100	Dn	75	2½	-	Gravel	Outwash and alluvium	-	-	-	L.
888	T14-2a	City of Lowell, Cook No. 21	1895	100	Dn	65	2½	-	do.	do.	-	-	-	
889	T14-2a	City of Lowell, Cook No. 82	1895	100	Dn	70	2½	-	do.	do.	-	-	-	
890	T13-2b	City of Lowell, Hydraulic No. 8	1895	100	Dn	53	2½	-	Sand and gravel	do.	-	-	-	L.
893	T14-2a	City of Lowell, Hydraulic No. 5	1895	100	Dn	38	2½	-	Sand	do.	-	-	-	L.
897	T13-2a	City of Lowell, Hydraulic No. 1	1895	100	Dn	58	2½	-	do.	do.	-	-	-	L.
898	T13-2a	City of Lowell, Hydraulic No. 9	1895	100	Dn	30	2½	-	do.	do.	-	-	-	L.
903	T14-7d	City of Lowell, Boulevard Well Field, Maher No. 5	1955	105	GP	52	24	-	Gravel	do.	13.20	1-11-55	PS	Y 722; dd 6.69. C. L. T 51.
							Pelham, New Hampshire							
1	T14-5b	J. P. Condon Corp.	1949	140	Dr	250	8	85?	-	Bedrock	10	-	I	Y 50. In dry weather the water level can be drawn below the pump intake which is 240 feet below the surface.
2	T14-5b	do.	1951	140	Dr	250	8	0	-	do.	Flowed	-51	I	Y 75; dd 70. C. T 49.
							TEWKSBURY							
1	T13-3a	-	1915	103	Dn	42	2½	43	Sand and gravel	Ice-contact deposits	-	-	-	Group of four driven wells. Y 21 of 3 wells pumped together; dd 24.42 measured in observation well 25 feet distant. L.
2	T13-3b	-	-	160	Du	16	42	-	-	Till	11	10- -15	-	Water has disagreeable odor.
10	T13-3b	Mrs. R. W. Whitehead	-	160	Du	20	48	18	Sand	do.	-	-	D	
18	T14-9f	McCormick	-	190	Du	7.8	42	-	Sandy	do.	1.85	12- 8-38	D	
19	T14-9f	F. S. Fessenden	1925	175	Du	19.0	24	-	Hardpan	do.	3.08	12- 8-38	D	Water "hard".
49	T13-3f	Henry Martel	1935	150	Du	7.6	36	8	-	do.	0.91	12-13-38	D	
62	T13-3b	J. J. Scott	-	170	Du	21.3	54	-	-	do.	13.72	12-15-38	D	
63	T13-3d	P. L. Haines	1893	145	Du	18	54	18	-	do.	-	-	D,S	Water "hard".
64	T13-3a	Gertrude E. Felker	1923	150	Dr	150	-	20	-	Bedrock	-	-	D,S	
65	T13-3b	Arthur Lafreniere	1910	160	Du	18.6	36	-	-	Till	7.95	12-15-38	D	Water "hard".
66	T13-3b	W. A. Davis	-	130	Du	13.2	24	-	-	Ice-contact deposits	5.22	12-15-38	D,S	Do.
67	T14-9h	G. F. Garland	1908	120	Du	16	36	-	"Quicksand"	do.	-	-	D,S	Do.
69	T14-9e	Robert Reid	-	120	Du	11.2	72	-	-	do.	6.80	12-15-38	D	
70	T14-9e	L. H. Amiot	1924	140	Du	9.6	54	-	-	do.	1.57	12-15-38	D	Water "hard".
73	T14-9j	Mrs. Gelinas	1937	140	Dr	120	8	30	-	Bedrock	28-30	-	D	
74	T14-9e	G. H. Thompson	1935	140	Dr	118	6	20-25	-	do.	15-18	-	D,Ir	Y 6. Water "hard" and "high in iron".
101	U13-1d	Commonwealth of Mass.	1935	110	Dn	25-30	2½	-	-	Ice-contact deposits	-	-	PS	About 40 wells in this well field.
108	T14-9f	Arthur Trull	1910	200	Dr	208	6	35-40	-	Bedrock	6	-10	D,Ir	Drill bit suddenly dropped 4 feet when depth of 204 feet was reached.
109	T13-3e	L. A. Roberts and H. L. Roberts	1954	150	Dr	174	6	60?	-	do.	20	-54	D	Y 5 at 160 feet. Y 30 at 174 feet.
110	T13-3d	Theresa Furtado	-	150	Du	23.9	48	-	-	Till	9.91	9- 3-54	D	

Table 2.--Records of selected wells and test holes in the Lowell,area, Massachusetts--Continued

Well no.	Location	Owner or user	Year completed	Altitude of land-surface datum (feet)	Type of well	Depth of well (feet)	Diameter of well (inches)	Depth to bedrock (feet)	Principal water-bearing material		Water			Remarks
									Character	Geologic unit	Level	Date of measurement	Use	
									TYNGSBOROUGH					
1	S14-9d	Knight	1903	150	Dr	81.0	6	-	-	Bedrock	17.15	10-28-38	D	
3	S14-6f	Walter Perham	-	290	Du	10	48	-	-	Till	-	-	-	
4	S14-6f	do.	-	305	Du	16	48	-	-	Bedrock	10	10- -38	D	
5	S14-6f	do.	1928	305	Du-Dr	232	120-8	15	-	do.	-	-	D,S	Water "hard".
6	S14-6b	J. E. Barr	-	240	Du	11.6	-	12	-	Ice-contact deposits	2.90	10-28-38	D	
7	S14-6e	L. H. Wainwright	1934	155	Dr	103	6	-	-	Bedrock	56	10- -38	D	Water "high in iron".
8	S14-6e	Langois	1908	195	Du	16	30	-	-	Till	6	-	D	Well reportedly penetrates bedrock.
9	S14-6e	L. F. Flanigan	1932	155	Dr	69	8-6	9	-	Bedrock	-	-	D	Y 30.
10	S14-6f	Mrs. Chester Queen	1916	210	Du	9.1	30	-	Gravel	Till	2.12	10-28-38	D	Water "high in iron".
11	S14-6e	Grace Coburn	1850	200	Du	21.8	24	-	Sand	do.	17.46	10-28-38	D	
12	S14-6a	Mrs. W. H. Goddard	1931	130	Du-Dr	50	25-6	20	-	Bedrock	-	-	D,S	Water level in outer 24-inch tile casing of dug well 9.61 feet below lsd 10-28-38.
13	S14-9b	J. A. Gage	1830	180	Du	27	28	23	-	Ice-contact deposits	14	-38	D	
14	S14-9b	do.	1908	180	Dr	72	6	-	-	Bedrock	14	-38	D	Well reportedly went dry in 1923.
15	S14-9b	Mrs. Crandle	-	165	Dr	43	6	10	-	do.	-	-	D	Y 6.
16	S14-6g	Brennan	1900	105	Du	20	54	-	"Quicksand"	Outwash and alluvium	15	-38	D	
18	S14-6g	Tyngsborough Country Club	-	140	Dr	130	-	10	-	Bedrock	-	-	PS,Ir	Pumped 24 hours daily when irrigating.
19	S14-6d	Mrs. B. M. Cohn	-	160	Dr	78	6 or 8	6	-	do.	29	-38	D	
20	S14-6d	LaFrance	1930	120	Dn	20	2½	-	-	Ice-contact deposits	14	-30	D	
22	S14-9e	Vesper Country Club	1908	105	Dn	26.1	2	-	"Sharp" sand	Outwash and alluvium	5.33	10-29-38	PS	Measured well No. 3 of five wells.
23	S14-6g	A. D. Butterfield	1912	185	Du	16	24	14	Sand	Ice-contact deposits	-	-	D	Well reportedly went dry in 1924.
24	S14-5j	Percy Locke	1936	150	Dr	105	6	0	-	Bedrock	-	-	D,S	
25	S14-6d	H. Harding	1934	125	Dn	17	1½	-	Sand	Ice-contact deposits	-	-	D,S	
29	S14-9c	George Tiller	1926	145	Du	8	60 x 84	-	Clay?	Outwash and alluvium	1.05	10-31-38	D	Well reportedly goes dry in July and August.
38	S14-6h	A. C. Farow	1936	185	Du	12.2	36	8	-	Bedrock?	11.41	10-31-38	D,S	
39	S14-9e	A. Bartlett	1921	140	Dr	35-45	8	28-38	-	Bedrock	-	-	D,S	Water "hard".
56	S14-9a	St. Joseph's Academy	1924	170	Du	17	30-24	-	-	Till	5	-38	PS	
57	S14-9a	do.	1923	160	Dr	214.9	8	15	-	Bedrock	9.46	11- 2-38	PS	
59	S14-9a	Arthur Hankinson	-	110	Du	15.6	24	-	Sand?	Outwash and alluvium	9.43	11- 2-38	D	
61-86	S14-5j	Commonwealth of Mass. Bridge T-9-1	1930	25-55	Dn	4.4-65	-	-	-	-	-	-	-	L.
87	S14-5f	Town of Dracut	1953	100	GP	46	18	-	Sand and gravel	Outwash and alluvium	-	-	PS	L.
88	S14-5f	do.	1953	100	GP	46.6	18	-	do.	do.	5.77	6-14-54	PS	L.

Table 3.--Drillers' logs of selected wells and test holes in the Lowell area, Massachusetts

(Thicknesses and depths below land-surface are given in feet)

	Thickness	Depth
BILLERICA 92.		
Loam	1	1
Sand	5	6
Sand and gravel	10	16
Sand, coarse	7	23
Sand and gravel	8.4	31.4
Hardpan	4.6	36
BILLERICA 93.		
Loam; subsoil; and sand and gravel	10.4	10.4
Sand, gray, medium to coarse	5.3	15.7
Sand, gray, coarse	10.8	26.5
Sand, medium and coarse	5.3	31.8
Sand, fine and medium, and broken gravel	4.8	36.6
Sand, fine, and broken gravel	6.8	43.4
BILLERICA 94.		
Loam; subsoil; and dirty gravel	10.8	10.8
Sand and gravel, gray. Pumped well	6.1	16.9
Sand and gravel, coarse. Pumped 10 gpm	5.6	22.5
Sand and gravel, gray, and traces of clay. Pumped poorly	4.7	27.2
Sand and broken gravel, and traces of clay. Pumped poorly	5.2	32.4
Sand, fine; clay; and broken gravel. Would not pump	6.5	38.9
Not described	1.1	40
Hardpan		at 40
BILLERICA 95.		
Loam; subsoil; and gravel	10.8	10.8
Sand, gray, medium. Pumped well	6.3	17.1
Sand, coarse, and gravel. Pumped 10 gpm	5	22.1
Sand; broken gravel; and traces of clay. Would not pump	5.7	27.8
BILLERICA 96.		
Loam; subsoil; and brown sand and gravel	11.1	11.1
Sand, coarse, and gravel. Pumped well	10.8	21.9
Sand, medium and coarse, and some gravel. Pumped well	5.1	27
Sand and gravel. Pumped well	5.4	32.4
Sand, gray, medium. Pumped poorly	4.4	36.8
Sand, fine; clay; and broken stone. Would not pump	5.7	42.5
BILLERICA 97.		
Sand, medium	14	14
Sand, medium and fine, and gravel	23	37
Sand, fine; gravel; and trace of clay	4.6	41.6
Ledge or rock		at 41.6
BILLERICA 110.		
Fill	1.5	1.5
Sand and gravel	15	16.5
Sand, fine	3.5	20
Sand and gravel	3	23
Sand, coarse, and gravel	2	25
Rock or boulder		at 25
BILLERICA 111.		
Fill	1.5	1.5
Sand and gravel	15.2	16.7
Sand, fine	3.5	20.2
Sand and gravel	5.5	25.7
Hardpan	.6	26.3
Rock or boulder		at 26.3
BILLERICA 112.		
Fill	1.2	1.2
Sand and gravel	14.1	15.3
Sand, fine, and gravel	3.9	19.2
Sand, hard, and gravel	6.8	26
Hardpan	.2	26.2
Rock or boulder		at 26.2
BILLERICA 113.		
Fill	1.3	1.3
Sand, coarse	10.7	12
Sand, fine	4.5	16.5
Sand, fine, and gravel	1.7	18.2
Sand and gravel	6.5	24.7
Hardpan	.3	25
Rock or boulder		at 25
BILLERICA 114.		
Fill	4.5	4.5
Sand and gravel	20	24.5
Rock or boulder		at 24.5
BILLERICA 115.		
Fill	5.5	5.5
Sand, medium, and gravel	8.5	14
Sand, brown, medium, and gravel	11	25
Sand, hard, and gravel	5	30
BILLERICA 116.		
Fill	8	8
Sand, medium	7	15
Sand, medium, and gravel	15	30
Rock or boulder		at 30
BILLERICA 117.		
Fill	5	5
Sand, medium, and gravel	5	10
Sand, coarse, and gravel	22.5	32.5
Sand, fine	1	33.5
Rock or boulder		at 33.5
BILLERICA 118.		
Fill	5	5
Sand, medium, and gravel	20	25
Sand, yellow	5.7	30.7
Sand and gravel	1.3	32
BILLERICA 119.		
Fill	5.5	5.5
Sand, medium, and gravel	21.5	27
Sand, yellow	7	34
BILLERICA 120.		
Sand and gravel, coarse	10	10
Sand, yellow, medium	15.5	25.5
Sand and gravel	3.2	28.7
Rock or boulder		at 28.7
BILLERICA 121.		
Fill	5	5
Sand, medium, and gravel	14	19
Sand, yellow	3.5	22.5
Sand, hard, and gravel	2	24.5
Rock or boulder		at 24.5
BILLERICA 242.		
Water	2.7	2.7
Mud	7.7	10.4
Sand, coarse	4.3	14.7
Sand, coarse, and gravel	5.8	20.5
Sand, hard; coarse gravel; and little clay	6.2	26.7
This log is representative of test borings Billerica 242-250.		
BILLERICA 251.		
Peat	1.3	1.3
Sand, medium, and very sharp gravel	5.7	7
Sand, coarse, loose, and gravel	10.5	17.5
Sand, fine, and very little clay	5.7	23.2
Hardpan	2.8	26
BILLERICA 252.		
Peat	0.7	0.7
Sand, medium, sharp	5.8	6.5
Sand, coarse, loose, and gravel	10.3	16.8
Sand, coarse, and gravel	3.2	20
Hardpan and gravel	2.0	22
BILLERICA 253.		
Peat	1.7	1.7
Sand, medium, sharp	5.3	7
Sand, loose, and gravel	10.3	17.3
Sand; gravel; and very little clay	6.1	23.4
Hardpan and rock	1.6	25
BILLERICA 254.		
Peat	0.8	0.8
Sand, medium, sharp, and gravel	8.8	9.6
Sand, loose, and gravel	7.9	17.5
Not logged	5.4	22.9
BILLERICA 255.		
Peat	1	1
Sand, medium, sharp	10.7	11.7
Sand, coarse, and gravel	4.8	16.5
Sand, fine; gravel; and very little clay	5.6	22.1
BILLERICA 256.		
Peat	1.7	1.7
Sand, medium, sharp	4.3	6
Sand, coarse	4.8	10.8
Sand, coarse, and gravel	9.3	20.1
Sand, fine, and little clay	.8	20.9
Sand; gravel; and little clay	2.3	23.2
Sand, yellow, and gravel	5.5	28.7
Hardpan and rock	5.0	33.7
BILLERICA 264.		
Loam	2.9	2.9
Clay; sand; and gravel. Compact	4.9	7.8
Clay; sand; and gravel. Very compact	1.3	9.1
Rock obstruction		at 9.1
This log is representative of test borings Billerica 258-271.		
BILLERICA 283.		
Sand; gravel; and some clay	1.2	1.2
Weathered rock	.6	1.8
Rock obstruction		at 1.8
This log is representative of test borings Billerica 272-285.		
BILLERICA 289.		
Loam	1.3	1.3
Sand; gravel; and clay	4.4	5.7
Mud; gravel; and clay. Very compact	1.1	6.8
Rock obstruction		at 6.8
This log is representative of test borings Billerica 286-300.		
BILLERICA 308.		
Loam, and some gravel	1.2	1.2
Sand, medium, and gravel	2.4	3.6
Clay; sand; and gravel. Very compact	3	6.6
Rock obstruction		at 6.6
This log is representative of test borings Billerica 301-313.		
BILLERICA 320.		
Loam	0.7	0.7
Sand, fine, and trace of clay.	4.5	5.2
Clay; sand; and gravel. Very compact	2.5	7.7
Rock obstruction		at 7.7
This log is representative of test borings Billerica 314-325.		
BILLERICA 333.		
Loam	2.5	2.5
Sand, fine, compact, and some gravel and clay	10.2	12.7
Rock obstruction		at 12.7
This log is representative of test borings Billerica 326-340.		
CHELMSFORD 71.		
Mud and peat	2	2
Sand and trace of clay	3	5
Sand, coarse	5	10
Sand and gravel	7	17
Sand, medium to fine	4	21
Sand, coarse, and gravel	13	34
Sand, fine; clay; and rocks		below 35
CHELMSFORD 78.		
Sand, fine	16	16
Hardpan	11	27
Rock		at 27
CHELMSFORD 115.		
Sand and gravel	19	19
Sand, white, fine	41	60
Sand, white, coarse	4	64
Rock		at 64
CHELMSFORD 116.		
Sand, coarse	27	27
Sand, white, coarse	44	71
Sand, white, very coarse	2	73
Rock		at 73

Table 3.--Drillers' logs of selected wells and test holes in the Lowell area, Massachusetts--Continued

	Thickness	Depth
CHELMSFORD 117.		
Mud	6	6
Sand, fine	9	15
Sand, red, coarse	.5	15.5
Sand, fine	35.5	51
CHELMSFORD 118.		
Sand, fine	20	20
Sand, coarse	6.5	26.5
Sand, fine	24.7	51.2
CHELMSFORD 119.		
Sand, fine	14	14
Sand, coarse	3	17
Sand, fine	33	50
CHELMSFORD 120.		
Sand, coarse	20	20
Sand, fine	31	51
CHELMSFORD 121.		
Mud	6	6
Sand, fine	14	20
Sand, red, coarse	13	33
Clay; hardpan; and boulders	9.4	42.4
CHELMSFORD 122.		
Sand, fine	10	10
Sand, coarse	26	36
Clay and hardpan	10	46
CHELMSFORD 123.		
Sand, fine	10	10
Sand, red, coarse	20	30
Sand, fine	20	50
CHELMSFORD 124.		
Sand, fine	17	17
Sand, fine to coarse	52	69
Sand, coarse	1.6	70.6
Rock		at 70.6
CHELMSFORD 125.		
Sand, fine	55	55
CHELMSFORD 126.		
Sand, fine	30	30
Sand, brown	14	44
Hardpan and rocks	1	45
Sand and clay	2.3	47.3
CHELMSFORD 127.		
Mud	3	3
Sand, red, coarse	18	21
Sand, white, coarse	22.5	43.5
Sand, brown, fine	4.7	48.2
Rock		at 48.2
CHELMSFORD 128.		
Loam	2	2
Sand, fine	7	9
Sand, coarse, and rocks	1	10
Sand, coarse	14.5	24.5
Rock		at 24.5
CHELMSFORD 129.		
Loam	1.5	1.5
Sand, medium, fine	37.5	39
Sand and gravel	5.3	44.3
Rock		at 44.3
CHELMSFORD 130.		
Sand, fine	20	20
Sand and gravel	13.8	33.8
CHELMSFORD 131.		
Sand, fine	11	11
Hardpan	8.4	19.4
Rock		at 19.4
CHELMSFORD 132.		
Sand, fine	14.8	14.8
Sand and gravel	13.2	28
Rock		at 28
CHELMSFORD 133.		
Sand, fine	16.5	16.5
Rock		at 16.5
CHELMSFORD 134.		
Sand, fine	17	17
Sand and gravel	2.2	19.2
Rock		at 19.2
CHELMSFORD 135.		
Sand, fine	26	26
Sand, coarse to medium	11	37
Sand; gravel; and clay	56	93
CHELMSFORD 136.		
Sand and gravel	20	20
Sand	33	53
Sand and gravel	22	75
Sand, very coarse; gravel; and some clay	17	92
CHELMSFORD 137.		
Sand and gravel	18	18
Sand, fine	11	29
Sand and gravel	11	40
Clay and hardpan	43	83
CHELMSFORD 138.		
Topsoil	2	2
Sand	9	11
Gravel	2.5	13.5
Sand	44.5	58
Sand, coarse	6	64
Sand; gravel; and clay	9.5	73.5
CHELMSFORD 139.		
Sand and gravel	31	31
Sand, brown, fine	11	42
Sand and gravel	11	53
Sand	8	61
Sand, gray, fine, and clay	6	67
Sand, gray, and gravel	15	82
CHELMSFORD 140.		
Mud	0.3	0.3
Gravel and sand	7.7	8
Sand, fine to medium	24	32
CHELMSFORD 141.		
Sand	11	11
Sand and gravel	12	23
Sand, medium to fine	5	28
Sand, fine to medium	13	41
Sand and gravel	9	50
Sand, medium to fine	7	57
Sand, gray; gravel; and clay	5	62
CHELMSFORD 216.		
Peat, soft	2	2
Sand, fine	4.9	6.9
Sand, loose, and little fine gravel	5.1	12
Sand, sharp, loose, and little fine gravel	23	35
Sand, blue, fine, firm; gravel; and clay	10	45
Rock or boulder refusal		at 45
This log is representative of test borings Chelmsford 209-220.		
CHELMSFORD 223.		
Peat, soft	5.5	5.5
Sand and gravel, coarse, sharp, loose	49.5	55
Sand and gravel, blue, hard; little clay; and boulders	5	60
This log is representative of test borings Chelmsford 221-230.		
CHELMSFORD 238.		
Loam	2	2
Sand, medium, loose	23	25
Sand, coarse, and gravel	7.5	32.5
Rock obstruction		at 32.5
This log is representative of test borings Chelmsford 231-240.		
CHELMSFORD 246.		
Sand, gray	-	-
Clay, blue	-	30
Hardpan	3	33
CHELMSFORD 247.		
Sand, gray	-	-
Clay, blue	-	37
Hardpan	9	46
CHELMSFORD 248.		
Sand, brown	-	-
Sand, gray	-	-
Gravel, brown	-	47
Hardpan		at 47
CHELMSFORD 250.		
Sand, brown	-	-
Sand, gray	-	-
Gravel, brown	-	49
Hardpan	16	65
CHELMSFORD 251.		
Sand, brown	-	-
Sand, gray	-	-
Gravel, brown	-	44
Hardpan	2	46
CHELMSFORD 252.		
Sand, gray	42	42
Hardpan		at 42
CHELMSFORD 253.		
Sand, gray	40	40
Hardpan		at 40
CHELMSFORD 258.		
Sand, gray	38	38
Boulder		at 38
CHELMSFORD 259.		
Sand, gray	23	23
Sand, brown, coarse	19	42
Gravel	43	85
Hardpan, blue	1	86
CHELMSFORD 260.		
Sand, gray	25	25
Sand, brown, coarse	17	42
Gravel	12	54
Gravel, coarse and fine	12	66
Gravel, coarse	23	89
Hardpan, blue		at 89
CHELMSFORD 262.		
Sand, gray	24	24
Sand, brown, coarse	18	42
Gravel	12	54
Gravel, coarse and fine	12	66
Gravel, coarse	28	94
Hardpan		at 94
CHELMSFORD 264.		
Sand, gray	27	27
Sand, brown, coarse	16	43
Gravel	13	56
Gravel, coarse and fine	12	68
Gravel, coarse	28	96
Hardpan, blue		at 96
CHELMSFORD 265.		
Sand, fine, and clay	54	54
Sand, gray, fine, and clay	33	87
CHELMSFORD 266.		
Sand, fine	15	15
Clay; sand; and some gravel	5	20
Sand, gray, fine; clay; and gravel	10	30
Gravel, sharp; fine sand; and clay	10	40
CHELMSFORD 267.		
Sand, gray, fine; broken gravel; medium sand; and clay	28	28
Rock or hardpan		at 28
CHELMSFORD 268.		
Sand, brown and gray, fine; medium sand; and coarse gravel	19.4	19.4
Sand, gray, fine; medium sand; coarse gravel	15.8	35.2
Sand, gray, fine; medium sand; coarse gravel; and trace of clay	14.8	50
CHELMSFORD 269.		
Sand, brown, fine and medium; sharp gravel; and clay	18.5	18.5
Sand, gray, fine; broken gravel; and clay	6.3	24.8
Hardpan		at 24.8
CHELMSFORD 270.		
Sand, gray and brown, fine and medium; broken gravel; and clay	18.3	18.3
Rock or hardpan		at 18.3

Table 3.--Drillers' logs of selected wells and test holes in the Lowell area, Massachusetts--Continued

	Thickness	Depth
CHELMSFORD 271.		
Sand, brown, fine and medium; broken gravel; and clay	20.7	20.7
Rock or ledge		at 20.7
CHELMSFORD 272.		
Sand, brown, fine; broken gravel; and clay	18	18
Rock or ledge		at 18
CHELMSFORD 273.		
Sand, brown, fine and medium, and clay	19.9	19.9
Sand, brown, fine and medium; broken gravel; and clay	6.7	26.6
Ledge or rock		at 26.6
CHELMSFORD 274.		
Sand, brown, fine; some gravel; and clay	26.3	26.3
Sand, brown, fine and medium; some gravel; and clay	5.5	31.8
Sand, brown, fine; broken gravel; and clay	7.2	39
Rock or ledge		at 39
CHELMSFORD 275.		
Sand, brown, fine and medium; gravel; and clay	19.4	19.4
Sand, brown, fine, and clay	5.3	24.7
Sand, brown, fine and medium; coarse gravel; and trace of clay	5.1	29.8
Sand, brown, fine and medium, and coarse gravel	10.9	40.7
Sand, brown, fine and medium, and clay	5.4	46.1
Sand, brown, fine and medium; broken gravel; and clay	3.3	49.4
Hardpan or rock		at 49.4
CHELMSFORD 276.		
Gravel, brown and gray, broken; fine sand; and clay	26.3	26.3
Hardpan or rock		at 26.3
CHELMSFORD 277.		
Sand, fine; brown gravel; and clay	20	20
Sand, brown, fine, and clay	21	41
Sand, brown, fine; very little gravel; and trace of clay	2.9	43.9
Sand, fine, and clay	5.4	49.3
Sand, gray, fine, and clay	15	64.3
Rock or ledge		at 64.3
CHELMSFORD 278.		
Peat	1	1
Gravel; fine sand; and clay	19	20
Sand, brown, fine, and clay	24.9	44.9
Sand, gray, fine, and clay	53.3	98.2
CHELMSFORD 279.		
Peat	2.3	2.3
Sand, brown and gray, fine; coarse gravel; and clay	17.5	19.8
Gravel, brown, and medium and fine sand	6	25.8
Gravel, brown; fine sand; and clay	6.3	32.1
Sand, brown, medium and fine, and clay	5.3	37.4
Gravel, gray, broken; fine sand; and clay	12.6	50
Rock or ledge		at 50
CHELMSFORD 282.		
Mud and fill; fine, muddy sand; and gravel	6	6
Sand and gravel	4.3	10.3
Sand, very fine; clay; and gravel	6.8	17.1
Sand; gravel; and clay; compact	14.4	31.5
Rock obstruction		at 31.5
Ten test borings, Chelmsford 281-290, made at this location. Chelmsford 282 and 290 representative		
CHELMSFORD 290.		
Loam	1.5	1.5
Sand, fine	5.2	6.7
Sand, fine, compact, and some clay	8.3	15
Sand and gravel, compact, and clay	15	30
Rock obstruction		at 30
CHELMSFORD 291.		
Gravel, brown, broken; medium and fine sand; and trace of clay	20.5	20.5
Gravel, brown, and medium and fine sand	19.5	40
DRACUT 66.		
Sand, dirty, and gravel	13.5	13.5
Sand, loose	10.5	24
Sand; gravel; and clay	5.5	29.5
Rock or boulder		at 29.5
DRACUT 67.		
Sand and gravel	12	12
Peat and soft sand	6	18
Sand, loose	2	20
Rock or boulder		at 20
DRACUT 68.		
Fill	8	8
Sand and gravel	5.5	13.5
Sand and peat	5.5	19
Sand, soft	3.5	22.5
Sand, firm	4	26.5
Sand and clay	3.5	30
Rock or boulder		at 30
DRACUT 69		
Sand and gravel fill	12.5	12.5
Peat; sand; and gravel	10.5	23
Sand, sharp	3	26
Sand and little gravel	5	31
Sand, hard, fine, and gravel	2	33
DRACUT 70.		
Sand, dirty	12.5	12.5
Sand, sharp	12.5	25
Sand, loose	3	28
Gravel and clay	1.5	29.5
Rock or boulder		at 29.5
DRACUT 71.		
Sand, loose, and gravel	16	16
Sand, dirty	2	18
Sand, firm	10	28
Sand and gravel	1	29
Rock or boulder		at 29
DRACUT 72.		
Sand, dirty, and gravel	9.5	9.5
Peat and sand	6.5	16
Sand, sharp	12.5	28.5
Sand; gravel; and clay	2.5	31
Rock or boulder		at 31
DRACUT 73.		
Hardpan to boulders	8.5	8.5
DRACUT 74.		
Sand, soft	9.5	9.5
Sand, fine, packed	9.3	18.8
Sand, hard-packed, and rocks	9	27.8
Sand and rocks	23	50.8
Sand; rocks; and little clay	20	70.8
Clay, blue, and rocks	11.6	82.4
Bedrock		at 82.4
DRACUT 111-120.		
Muck	3	3
Sand, fine	5	8
Clay, sandy	10	18
Gravel	7	25
Boulders	-	-
Quicksand	-	38
DRACUT 137-144.		
Muck	8	8
Sand	9	17
Sand and rocks	-	-
LOWELL 8.		
Gravel	12	12
Shale	3	15
Ledge		at 15
LOWELL 64.		
Topsoil; fine sand; and some gravel	15.3	15.3
Sand, fine	10.6	25.9
Sand, medium and fine	4.8	30.7
Sand, fine	10.4	41.1
Sand, fine and medium, and some coarse sand	4.8	45.9
Sand, fine and medium	5	50.9
Sand, medium and coarse	11.8	62.7
LOWELL 66.		
Sand, gray, medium to coarse	16	16
Sand, fine, and trace of clay.	18	34
Sand, fine and medium	9.8	43.8
Sand, medium, and some coarse sand	28.1	71.9
LOWELL 68.		
Sand, gray, medium, and some coarse sand	17.7	17.7
Sand, gray, fine, and traces of clay	21.5	39.2
Sand, gray, fine, and clay	5.3	44.5
Sand, yellow, fine, and trace of clay, yellower at 46 feet	10.7	55.2
LOWELL 69.		
Sand, gray, fine, and some gravel	16.8	16.8
Sand, fine, and some clay	21.3	38.1
Sand, fine, and pure clay	5.5	43.6
Sand, medium, and gravel	4.5	48.1
Sand, gray, and tight gravel	6.3	54.4
Sand, coarse, and some gravel.	5.3	59.7
Ledge or hardpan	5.5	65.2
LOWELL 70.		
Topsoil and fine sand	19	19
Sand, fine, and some clay	11	30
Sand, fine; some gravel; and some clay	22.8	52.8
Sand, medium, and some clay	5	57.8
Sand, fine; some gravel; and some clay	4.5	62.3
Sand, fine and some clay	5.7	68
LOWELL 71.		
Topsoil; fine sand; and clay	19.8	19.8
Sand, gray, fine, and some clay	19.2	39
Sand, brown, medium; some gravel; and trace of clay	3	42
Sand, medium; some gravel; and trace of clay	10.4	52.4
Sand, medium, and some gravel.	1.6	54
Sand; gravel; and trace of clay	3.2	57.2
LOWELL 77.		
Sand, fine, compact	28	28
Sand, coarse. Yield 25 gpm	2	30
Sand, coarse, and fine gravel.	10	40
Sand, coarse, and gravel	18	58
Sand; gravel; and clay. (Hardpan)	3	61
LOWELL 78.		
Sand, fine, compact	25	25
Sand, coarse, and gravel	10	35
Sand, coarse, and fine gravel.	15	50
Sand, fine	10	60
LOWELL 79.		
Sand, coarse, and gravel	38	38
Sand, fine	18	56
Sand; gravel; and clay. (Hardpan)	4	60
LOWELL 80.		
Sand, coarse, and gravel	48	48
Sand, fine, and rocks. Does not yield water	8	56
LOWELL 81.		
Sand, coarse, and gravel	20	20
Sand, fine, and occasional streaks of clay	21	41
Sand and gravel, hard-packed	2	43
Sand; gravel; and rocks and clay. (Hardpan)	10	53
LOWELL 82.		
Sand, medium	20	20
Sand, coarse, and gravel	40	60
LOWELL 83.		
Soil	2	2
Sand, fine	23	25
Sand, coarse	10	35
Sand, coarse, and gravel layers	14	49
Sand, fine	17	66
Rock obstruction		at 66

Table 3.--Drillers' logs of selected wells and test holes in the Lowell area, Massachusetts--Continued

	Thickness	Depth
LOWELL 91.		
Sand, fine, compact	35	35
Sand, fine, sharp, compact	20	55
Sand, fine	31	86
Rock obstruction		at 86
LOWELL 92.		
Sand, medium, loose	13	13
Sand, fine, compact	25	38
LOWELL 93.		
Sand, medium, compact	8	8
Sand, fine, compact	32	40
LOWELL 94.		
Ashes (fill)	12	12
Sand, medium	33	45
Sand, fine, compact, and trace of clay	13	58
LOWELL 96.		
Sand, fine	47	47
Sand, medium, and gravel	18	65
Gravel, and some sand	10	75
LOWELL 104.		
Sand and gravel	16.6	16.6
Sand, fine	15.3	31.9
Sand, fine, and gravel	16.3	48.2
Sand and gravel	5.2	53.4
Sand, coarse, and gravel	5.3	58.7
Sand and gravel	5.6	64.3
Ledge		at 64.3
LOWELL 105.		
Sand, fine	29	29
Sand, fine, and clay	8	37
Sand and gravel	10	47
Not described	2.1	49.1
Ledge		at 49.1
LOWELL 108.		
Sand, fine	18	18
Sand, medium	6.3	24.3
Sand, medium, and gravel	10.7	35
Sand, fine, and clay	11.7	46.7
Rock		at 46.7
LOWELL 112.		
Sand, fine	18	18
Sand, brown, and gravel	9	27
Sand, gray; gravel; and clay	37.7	64.7
Sand, hard-packed, and gravel	5.3	70
Rock		at 70
LOWELL 113. (Log of test well Lowell 99 at this site.)		
Sand, fine	18	18
Sand, brown, medium to fine	2	20
Sand, medium to fine. Plugged when pumped	6	26
Sand, fine, and some gravel	6.7	32.7
Sand, fine	5.6	38.3
Sand, fine, and some clay	17	55.3
Sand, fine, and clay	5.5	60.8
Sand and clay	24.5	85.3
Sand, coarse, and clay	1	86.3
Refusal		at 86.3
LOWELL 114. (Log of test well Lowell 100 at this site.)		
Sand, medium to fine. Plugged when pumped	37.4	37.4
Sand, medium to fine, and trace of clay	15.6	53
Sand, gray, fine, and clay	19.3	72.3
Refusal		at 72.3
LOWELL 115. (Log of test well Lowell 101 at this site.)		
Sand; gravel; and topsoil	21.8	21.8
Sand, reddish-brown, medium	5.3	27.1
Sand, medium to fine	11.6	38.7
Sand and some gravel	6.1	44.8
Sand, brown	5.4	50.2
Sand and gravel	4.8	55
Sand, medium	5.4	60.4
Sand, brown, medium, and some gravel	9.6	70
Sand, gray, fine	5	75
Refusal		at 75
LOWELL 116. (Log of test well Lowell 102 at this site.)		
Sand, brown; some gravel; and trace of clay	21.9	21.9
Sand, medium to fine	38.1	60
Sand, gray, medium to fine	10.4	70.4
Sand, gray, and clay	5.1	75.5
LOWELL 798.		
Sand, sharp (fill)	7.6	7.6
Sand, sharp	11.7	19.3
Sand, coarse, and gravel	.9	20.2
Sand, fine, and little clay	11.2	31.4
Sand, coarse, and gravel	4.1	35.5
Ledge or boulders		at 35.5
This log is representative of test borings Lowell 798-808.		
LOWELL 809.		
Miscellaneous fill	41	41
Clay, gray; sand; and gravel	4	45
Sand, medium; gravel; and boulders	2	47
Sand, gray, medium, hard, and gravel	9	56
Sand, coarse, hard and gravel.	6	62
Refusal		at 62
Sixteen test borings and four core borings, Lowell 809-828, made at this location: The log of Lowell 809 is representative of the test borings.		
LOWELL 812.		
Miscellaneous fill	9	9
Sand, gray, fine, hard	9	18
Sand, coarse, hard, and gravel	10	28
Sand, brown, fine, hard	15.5	43.5
Shale, gray, soft; chopped	1.5	45
Shale, gray; cored	10	55
Sixteen test borings and four core borings, Lowell 809-828, made at this location: The log of well Lowell 812 is representative of the core borings.		
LOWELL 830.		
Sand, gray, fine	10.8	10.8
Sand and gravel	2	12.8
Rock		at 12.8
Thirty-four test borings, Lowell 830-863 made at this location: Logs of Lowell 830, 840, 848, and 850 are representative.		
LOWELL 840.		
Sand, gray, fine	10	10
Sand, gray, fine, loose	4.9	14.9
Sand and gravel, loose	5.7	20.6
Sand, very fine	15	35.6
Sand, coarse, and gravel	3	38.6
Sand, gray, fine	3.4	42
LOWELL 848.		
Sand, very fine	19.2	19.2
Sand and gravel, coarse, sharp, loose (water)	11.8	31
LOWELL 850.		
Sand, fine, loamy	2	2
Sand, yellow, fine, firm	6.2	8.2
Rock		at 8.2
LOWELL 871.		
Sand; gravel; brick; cinders; boulders; and wood fill	25	25
Sand, blue, fine, hard; gravel; and boulders	4	29
Refusal		at 29
This log is representative of test borings Lowell 864-877.		
LOWELL 878.		
Fill	4	4
Sand, fine to medium, silty; scattered pebbles; and occasional cobbles	10.5	14.5
Sand, gravelly and slightly silty; scattered pebbles; and occasional cobbles	7	21.5
Silt, sandy and slightly clayey, and occasional pebbles	8.5	30
LOWELL 879.		
Fill	2.5	2.5
Sand, fine to medium, silty, small lens of fine to coarse sand at 12.8 feet	10.3	12.8
Sand, gravelly, varying at 17.5 feet to silty and slightly gravelly sand, and numerous scattered cobbles	10.2	23
Silt, clayey and slightly sandy	7	30
LOWELL 880.		
Fill	4	4
Sand, fine to medium, silty	9	13
Sand, gravelly; scattered cobbles; and pebbles	11	24
Silt, sandy and slightly clayey; and occasional pebbles	6	30
LOWELL 881.		
Fill	4.7	4.7
Sand, fine to medium	6.3	11
Sand and gravel	3.7	14.7
Sand, medium to coarse	.7	15.4
Sand, coarse, slightly gravelly	5	20.4
Silt, slightly clayey	9.6	30
LOWELL 882.		
Fill	13.5	13.5
Sand, fine to medium, silty	7.8	21.3
Sand, gravelly and slightly silty	8.7	30
LOWELL 883.		
Sand, gravelly; small lens of clayey and slightly sandy silt at 4.6 feet; and scattered cobbles	11	11
Sand, silty; silty and gravelly sand at 12.5 feet; and scattered cobbles	6	17
Silt, sandy, slightly gravelly and slightly clayey	3	20
LOWELL 884.		
Fill	7.5	7.5
Sand, fine to medium, silty, and fine sand and silt at 13.5 feet	9.5	17
Sand, fine to coarse, and occasional cobbles	8.7	25.7
Silt, fine, sandy, slightly clayey	4.3	30
LOWELL 885.		
Fill	17.5	17.5
Sand, slightly silty	7.5	25
LOWELL 886.		
Silt, sandy, slightly compact.	5.8	5.8
Sand, gravelly and silty, and occasional cobbles (till)	14.2	20
Schist, mica core in one small fragment	1.5	21.5
Diorite-Gabbro-hornblende, biotite, chlorite badly broken with calcite along few joints	7.7	29.2
Schist, mica, some calcite along few joints	.9	30.1
Quartzite, some calcite on joints	.2	30.3
LOWELL 887.		
Sand, fine	19	19
Sand, fine, and clay	33	52
Gravel	30	82
Hardpan		at 82
LOWELL 890.		
Sand, fine	20	20
Sand, fine, and clay	10	30
Gravel	23	53
Hardpan		at 53
LOWELL 893.		
Sand, gray	58	58
Hardpan		at 58

Table 3.--Drillers' logs of selected wells and test holes in the Lowell area, Massachusetts--Continued

	Thickness	Depth
LOWELL 897.		
Sand, gray	58	58
Hardpan		at 58
LOWELL 898.		
Sand, gray	-	-
Clay, blue	-	28
Hardpan	2	30
LOWELL 903.		
Sand, brown, medium; clay; and gravel	18.4	18.4
Sand, brown, fine to medium, and some gravel	21.8	40.2
Sand, brown, fine to medium, and sharp gravel	5.3	45.5
Sand, brown, fine to medium, and some sharp gravel	5	50.5
Sand, brown, fine to medium; sharp gravel; and trace of clay	11.5	62
Not described	0.3	62.3
Refusal		at 62.3
TEWKSBURY 1.		
Loam and coarse sand	9	9
Sand, very fine	30	39
Gravel, coarse	3	42
Bedrock	1	43
TYNGSBOROUGH 61.		
Sand, loamy, soft	14	14
Sand, fine, hard; gravel; and small boulders. Hardpan	3	17
Rock obstruction		at 17
Twenty-six test borings made at this location. Logs of Tyngsborough 61, 80, and 86 are representative.		
TYNGSBOROUGH 80.		
Sand, fine, dirty, loose	8	8
Sand, fine, hard, and coarse gravel	5.8	13.8
Rock obstruction		at 13.8
TYNGSBOROUGH 86.		
Sand, loamy, soft	9.6	9.6
Sand, coarse, hard; gravel; and boulders	1.7	11.3
Sand, coarse, dirty, loose, and little gravel	24.7	36
Sand, gray, fine, firm	29	65
TYNGSBOROUGH 87.		
Sand, medium-fine; gravel; and trace of clay	20.4	20.4
Sand, medium	5.1	25.5
Sand, fine, and gravel	5	30.5
Sand, fine to coarse	10	40.5
Sand, medium-fine, and gravel	5.5	46
Sand, fine, and trace of clay; tight	4.3	50.3
TYNGSBOROUGH 88.		
Sand and gravel	15	15
Sand, medium	5	20
Sand, medium-fine	16	36
Sand, medium-coarse	5	41
Sand; gravel; and streak of clay	5	46
Sand, medium-coarse, and gravel	5	51
Sand; gravel; and streak of clay	10	61
Sand, medium	6	67
Sand; gravel; and streak of clay	5.5	72.5

Table 4.--Chemical analyses of water from wells and streams in the Lowell area, Massachusetts

(Analytical results in parts per million except as indicated.)

(Analyses by U. S. Geological Survey.)

Well no.	Date of collection	Temperature (°F)	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Copper (Cu)	Zinc (Zn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Lithium (Li)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color 1/
																					Calcium and magnesium	Noncarbonate			
Billerica 22	1-12-55	46	14	0.0	0.32	0.00	0.00	0.34	36	12	24	56	2.3	61	47	56	0.0	127	0.0	444	140	90	644	7.5	5
92	1-12-55	42	8.0	.0	2.0	.74	.00	.00	7.8	2.7	6.1	1.4	.1	16	16	8.8	.0	2.6	.0	60	31	18	97.4	7.2	5
257	3- 5-54	54	8.7	.0	.13	.00	.05	.00	3.3	1.0	3.3	.8	.0	9.6	3.4	5.6	.0	.3	.0	33	13	5	43.5	6.4	2
Chelmsford 244	6-16-54	54	17	-	.78	.00	-	-	13	3.8	6.1		-	58	.5	9	.1	.3	-	103	48	1	144	7.9	2
280	1-12-55	50	14	.0	.05	.00	.00	.00	5.9	.8	3.4	1.0	.1	18	8.3	4.0	.0	.8	.0	43	18	3	65.5	6.8	3
Dracut 63	1-11-55	49	12	.0	.03	.00	.00	.00	9.4	2.6	3.1	1.6	.1	21	18	2.8	.0	2.7	.0	58	34	17	92.4	6.7	3
150	6-16-54	54	9.8	-	.34	.00	-	-	20	1.6	2.2		-	44	17	5	.1	.4	-	107	56	20	146	7.3	2
160	1-12-55	43	7.6	.1	.13	.00	.00	.22	22	3.6	3.2	4.8	.2	81	8.5	1.5	.0	6.5	.0	99	71	4	162	7.8	3
190	6-11-54	53	7.4	-	.41	.00	-	-	5.5	.8	5.0		-	15	5.6	5	.0	3.4	-	49	17	5	68.6	7.1	2
192	6-14-54	52	9.5	-	.33	.01	-	-	18	2.3	11		-	64	12	8	.1	1.8	-	110	54	2	174	8.1	3
Lowell 116	1-11-55	49	14	.0	.84	.07	.00	.00	11	2.8	8.2	2.3	.2	16	25	14	.0	3.3	.0	87	40	26	137	7.0	5
903	1-11-55	51	16	.0	.15	.14	.00	.00	17	2.3	11	3.2	.2	37	21	16	.0	12	.0	116	52	22	184	6.7	3
Pelham 2	6-14-55	49	8.1	-	.24	.00	-	-	57	5.8	3.2		-	112	70	3	.2	4.3	-	239	166	74	375	8.2	2
Concord River at Lowell	10-21-52	-	5.2	-	.51	-	-	-	7.6	2.0	18	3.0	-	19	21	22	.5	2.9	-	96	27	12	165	6.5	-
Do.	4-23-53	-	1.5	-	.19	.00	-	-	6.7	1.0	7.4	1.0	-	9.3	17	10	.2	.9	-	63	21	13	92.7	5.7	28
Merrimack River at Lowell	10-19-53	-	7.1	-	1.0	.00	-	-	12	2.3	19	4.8	-	36	19	16	.3	7.0	-	133	40	11	190	6.7	42
Do.	4-30-54	-	3.0	-	.08	.00	-	-	5.9	.7	5.8	1.7	-	12	14	7.8	.0	2.2	-	61	21	11	83.2	6.1	20

1/ Color data were obtained by comparing color of water sample to the platinum-cobalt scale of Hazen (1892, p. 427, 428).

Table 5.--Records of selected springs in the Lowell area, Massachusetts

Spring no.	Location	Owner or user	Altitude of land-surface datum (feet)	Principal water-bearing material		Yield		Use of water	Temperature (°F)	Remarks
				Character	Geologic unit	Rate (gpm)	Date of measurement			
Billerica 1sp	T13-5j	-	170	-	Bedrock	-	4- 9-54	PS	46	Probably a fracture spring. Spring house encloses the opening.
2sp	T13-6c	-	140	-	Till	-	9-29-54	D	55	Water discharges from pipe driven horizontally into hillside in bed of dry gully. No openings visible.
Dracut 4sp	T14-9c	-	60	Sand	Ice-contact deposits	-	5-17-54	D	47	Water flows from pipe driven into hillside at base of an ice-contact terrace.
Lowell 1sp	T14-7d	City of Lowell	130	Gravel	do.	3	12-14-38	PS	46	Lowell 1sp and 2sp are located in a gravel pit. Lowell 2sp is about 3 feet higher than Lowell 1sp.
2sp	T14-7d	do.	130	do.	do.	-	-	PS	47	
4sp	T14-7h	Mount Pleasant Spring	120	-	do.	-	-	I	-	Spring house encloses the opening.
5sp	S14-9f	Copper Kettle	130	-	do.	3	12-14-38	-	50	Spring flows at contact of ice-contact material and underlying bedrock.

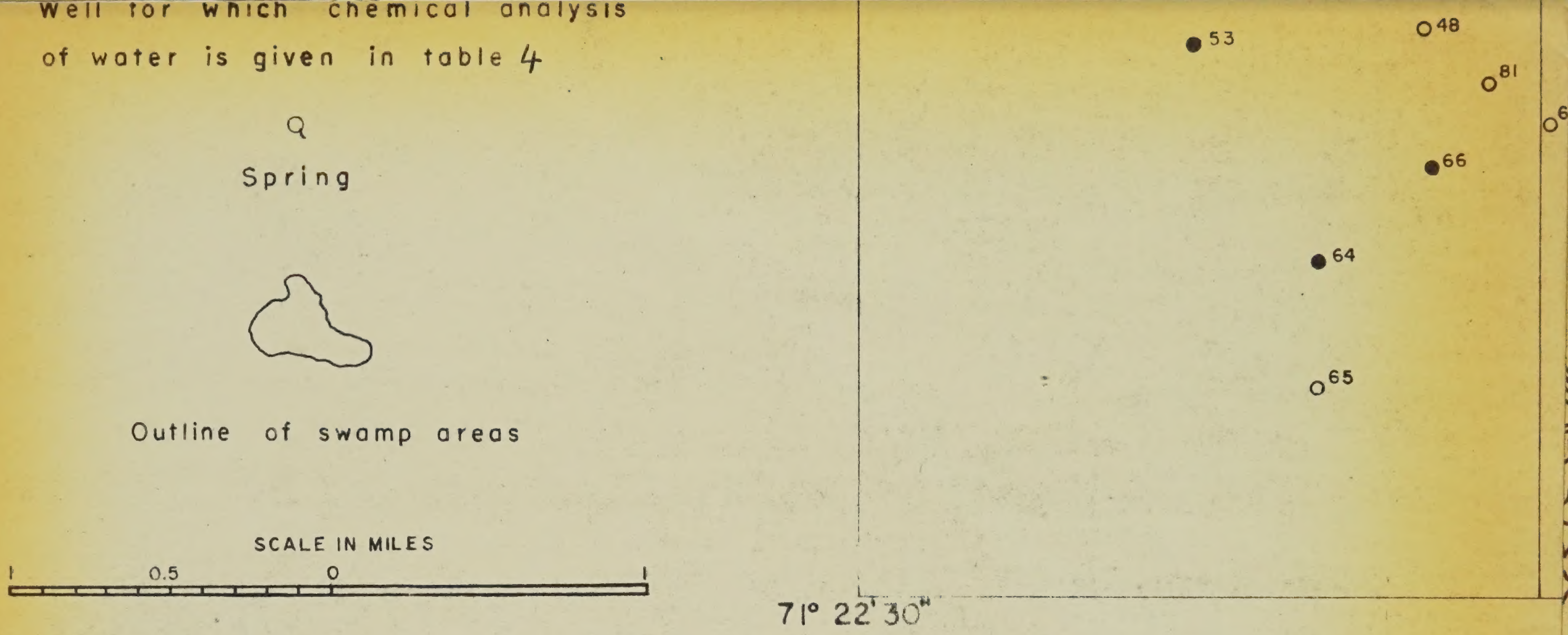


FIGURE 1 - MAP OF THE LOWE
SHOWING LOCATIONS OF WELLS,

FIGURE 1 - MAP OF THE LOWELL AREA, MASSACHUSETTS, SHOWING LOCATIONS OF WELLS, TEST BORINGS, AND SPRINGS

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